APPENDIX.

A. NEUROPTERA.

I. *Description of a new Species of Embiidae from Southern Nigeria.* By Prof. F. Silvestri.

Plates IX, X.

Embia (Rhagadochir) apicata, sp. n.

♂. Corpus (exsiccatum) castanco-nigrescens thorace ochraceo-ferrugineo, antemarum parte distali albicante, alis castaneis lineis intervenalibus albis, pedibus castaneis, cercis castaneis parte distali albicante.

Caput subaeque longius (labro excluso) atque latius (oculis inclusis), lateribus pone oculos gradatim parum convergentibus, angulis posticis rotundatis, superficie setis brevioribus et brevissimis vestita. Oculi reniformes, aliquantum prominentes. Antennae 24-articulatae attenuatae, articulo primo subcylindraceo quam ceteri aliquantum latiore, articulo tertio c. 1/3 longiore quam latiore et quam secundus etiam c. 1/3 longiore, articulo quarto secundo longitudine subaequali, articulo decimo parum minus quam dimidium longiore quam latiore, articulis omnibus setis numerosis subtilibus sat longis instructis. Mandibulae apice bidentato instructae.

Pronotum postice parum latius quam longius, lateribus partem antieam versus aliquantum convergentibus, setis numerosis brevibus instructum; mesonotum margine antico setis longis antrorsum nec non setis numerosis medianis subanticis instructum; metanotum nudum scuti margine postico subrecto. Alae venis *vide* Pl. IX, 1–3.

Pedes setosi, primi paris tarsi articulo primo, subtus menso, parum magis quam duplo longiore quam latiore, tertii paris coxa, lateraliter mensa, duplo longiore quam latiore, secundi et tertii paris tarso *vide* Pl. IX, 5, 6. Abdomen setosum segmenti ultimi forma et cerci *vide* Pl. IX, 7, 8.

Long. corp. cum alis mm. 12·5, sine alis 10·5, lat. capitis (cum oculis) 1·60, pronoti partis posticae 1·30, mesonoti 1·56, long. antenn. 6·5, alae anticae 10·3, lat. ejusdem 3, long. ped. paris tertii 5.

♀. Corpus nigrescens prothorace testaceo-ochraceo, antennis parte distali albicante, pedibus nigrescentibus, coxis, trochanteribus testaceo-ochraceis, tibiarum basi et secundi et tertii paris tarsis aliquantum rufescentibus.

Caput subellipticum, paullum longius quam latius, lateribus late convexis, oculis vix prominentibus. Antennae in exemplo typico haud integrae, articulo tertio quam secundus vix longiore, articulo decimo vix longiore quam latiore. Mandibulae (Pl. X, 5) apice unidentato, parte molari transverse profunde sulcata.

Thorax pronoto subtrapezoideo, mesonoti scuto quam idem metanoti parum longiore et paullum angustiore.

Pedes primi paris tarsi articulo primo, subtus menso, parum magis quam duplo longiore quam latiore, paris tertii femore, lateraliter menso, parum magis quam 1/3 longiore quam latiore, secundi et tertii paris tarsi *vide* Pl. X, 1–3.

Abdomen a segmento septimo parum, a segmento octavo aliquantum angustius, tergiti decimi margine postico rotundato, cercis *vide* Pl. X, 4.

Long. corp. mm. 14, lat. capitis 2·2, pronoti partis posticae 1·60, mesonoti 2, long. pedum paris tertii 5·6.

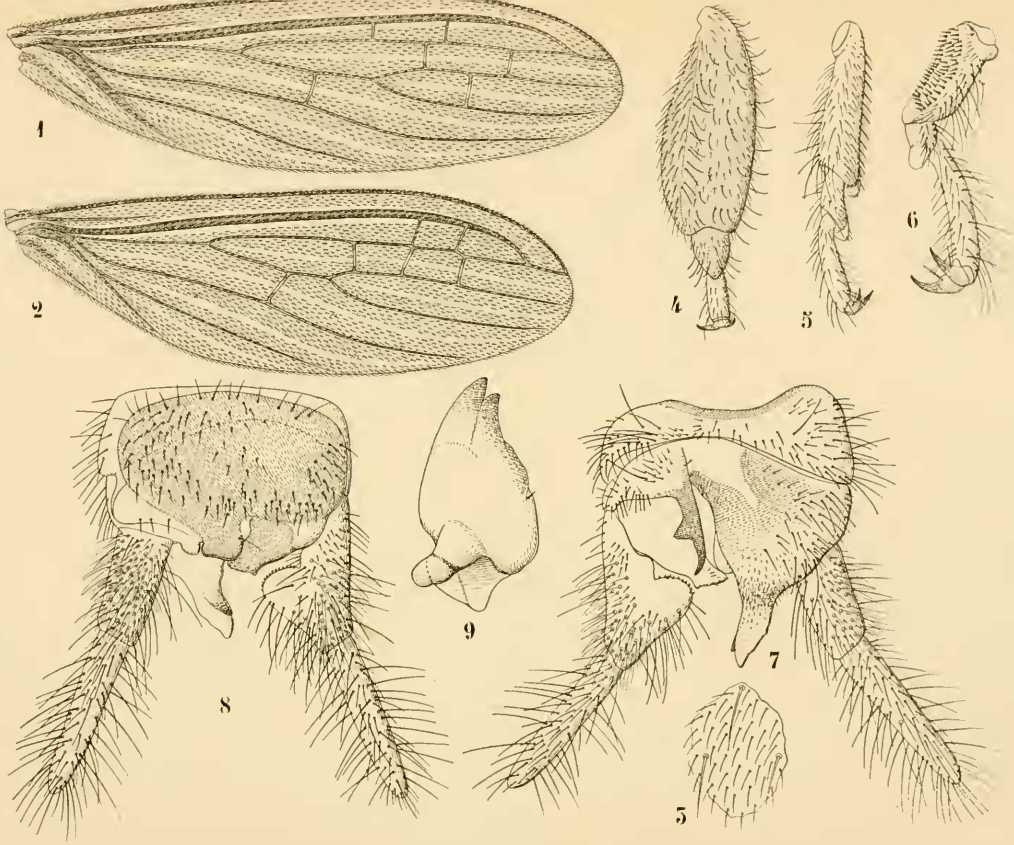
[Two ♂ and 2 ♀ from webs on Pará Rubber trees at Agege, near Lagos: 1917–1918. For notes on the webs and enclosed Embias see pp. 413–16.—E.B.P.]

Larva. Corpus totum testaceum. Antennae 15–19-articulatae, articulo tertio quam secundus aliquantum longiore.

Long. corp. mm. 7; lat. capitis 0·92.

[These larvae were from the cotton-seed sacks at Moor Plantation (pp. 415–16). Prof. Silvestri wrote concerning them, Jan. 12, 1921: "It is very probable that these larvae belong to the same species as the ♂ and ♀, but one cannot be absolutely certain if they were not collected near the adults. The web and the environment of the larva may be rather different from those of the adults."—E.B.P.]

Observatio. Species haec ad *Embia* (*Rhagadochir*) *vosseleri* End. proxima est, sed colore et maris partis laevae tergiti decimi forma saltem distincta est.



Trans. Ent. Soc. Lond., 1921, Plate IX.

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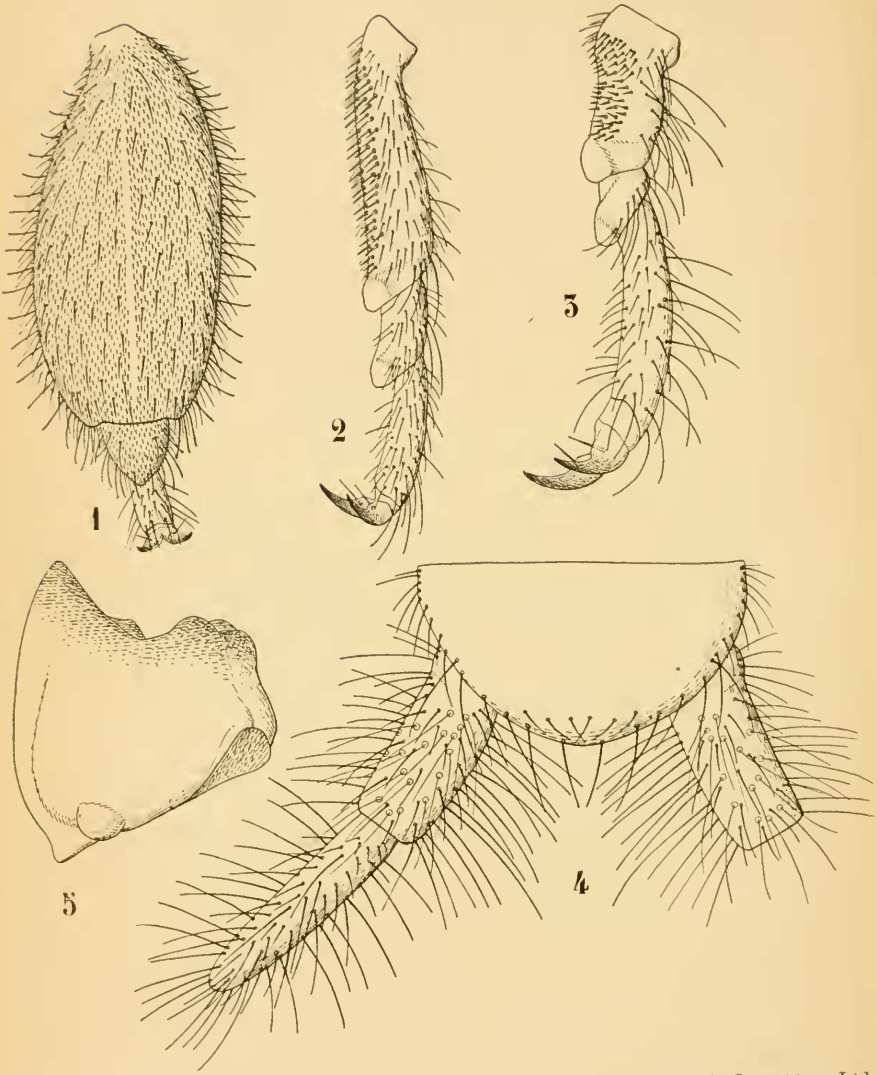
EMBIA (RHAGADOCHIR) APICATA Silvestri (male)



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EMBIA (RHAGADOCHIR) APICATA Silvestri (female).

Explanation of Plate IX.

Embia (*Rhagadochir*) *apicata*, mas: 1, ala antica; 2, ala postica; 3, alae particula, multo ampliata; 4–6, pedum primi, secundi et tertii paris tarsus et praetarsus; 7, corporis pars posterior a segmento nono prona; 8, eadem supina; 9, mandibula dextera supina.

Explanation of Plate X.

Embia (*Rhagadochir*) *apicata*, femina: 1–3, pedum primi, secundi et tertii paris tarsus et praetarsus; 4, corporis pars posterior a segmento decimo; 5, mandibula dextera supina.

II. *Corrodentia : Psocidae. On a new Southern Nigerian Psocid.* By Prof. R. Newstead, F.R.S.

Plate XI. Text Figure 1.

Psocus nigeriensis, sp. n.

General colour of body dusky ochraceous, legs slightly paler than thorax with the distal extremities of the tibiae dark brown or black; spines on the legs dark brown or black; nasus sometimes with very faint traces of dark brown, interrupted, vertical markings. Antennae with the first three segments slightly paler than the thorax, the rest dark brown or blackish. Wings with the venation normal, perostigma very faintly infuscated; there is also a small faintly infuscated area immediately below the superior

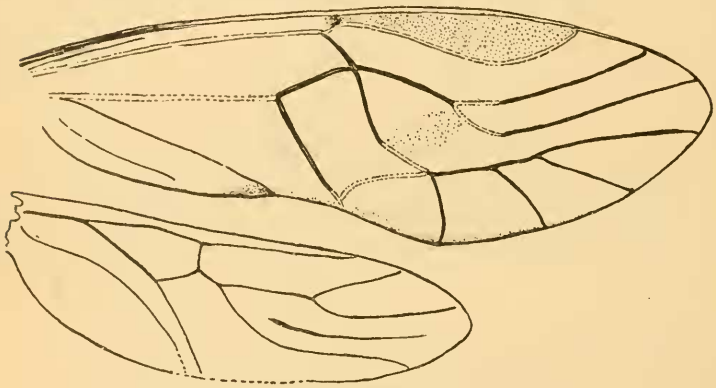


Fig. 1. *Psocus nigeriensis*, Newstead.

apical furcation; the transverse vein and the proximal branches of the forked vein (forming roughly the cursive numeral 4, upside down on the left and also retrograde on the right), also the veins enclosing the marginal cellules 2–4, and the major portion of the superior apical furcation, intense dark brown to blackish; the remaining portions of the veins faintly indicated and almost colourless. Eyes either partially or entirely black.

♀. Number of antennal segments doubtful (ten were counted in one individual, but this appeared to be imperfect); 1st and 2nd segments very short and the former moniliform and much stouter than the 2nd; 3rd and 4th equal in length, and about ten times longer than the 2nd. Maxillary palpi (Pl. XI, *a*) with the 2nd seg-

ment nearly equal in length to the 4th, all the segments with fine stiff hairs. The long, "slender, curved, horny process" (Westwood) or maxillary fork normal (Pl. XI, *b*). Mandibles (Pl. XI, *c*) asymmetrical, tridentate distally, inner surface, at the base, with a large and somewhat quadrate tooth-plate or rasp-like structure composed of 16 rows of minute teeth (Pl. XI, *c*1); immediately above this on the inner margin of the right mandible is a small blunt tooth. Lingua (Pl. XI, *d*) composed of two broad, blade-like processes the edges of which are folded over and finely but bluntly serrate, the two structures fused in the middle line so that collectively they form a trough-like process. Pharynx or pharyngeal sclerite strongly chitinised and leading from this is a strongly defined chitinous chord or "lingual duct" (Pl. XI, *d*1) which bifurcates just beyond the middle distance, one branch going to each of the two blade-like structures ("lingual glands") respectively, each one terminating at the anterior margin where they are apparently connected with a small opening or channel. Tibiae of all the legs thickly clothed with long, stiff spines (Pl. XI, *e*) each of which is partly surrounded, at the base, by a minute coronet of short stiff spines; tarsi of two segments, those of legs ii and iii (Pl. XI, *e*1) with a closely packed series of long stout curved spines, each surrounded by a coronet of short spines ("ctenidiobothrien"), similar to, but much larger than, those on the tibiae; on the proximal segment of leg ii there are 13 and on the distal one 3; on leg iii there are 24 and 6 respectively. Abdomen very sparsely clothed with minute hairs; distal segments (Pl. XI, *f*) with the sclerite of the 9th abdominal sternite of three processes, the median one more or less pointed, the laterals (Pl. XI, *f*2) quadrate with the distal margin furnished with small bluntly pointed spines; terminal segment with two pairs of spine-like processes (Pl. XI, *f*1) the lower pair much the larger.

Length of specimen restored in KOH, 3·5 mm.

Length of fore-wing, 6·3 mm.; total expanse of wings, 14 mm. approximately.

♂. Abdominal hairs longer and more numerous than in the ♀. Genital armature of the only example before me, has not restored sufficiently in the KOH to enable me to determine the morphological characters with any degree of exactness. I can only add that the lateral lobe-like extensions are rather thickly studded with very long hairs (Pl. XI, *g*) each of which is surrounded by a rosette-like pattern.

West Africa: Agege, S. Nigeria, gregarious on the bark of Pará Rubber (*Hevea brasiliensis* Müll. Arg.);

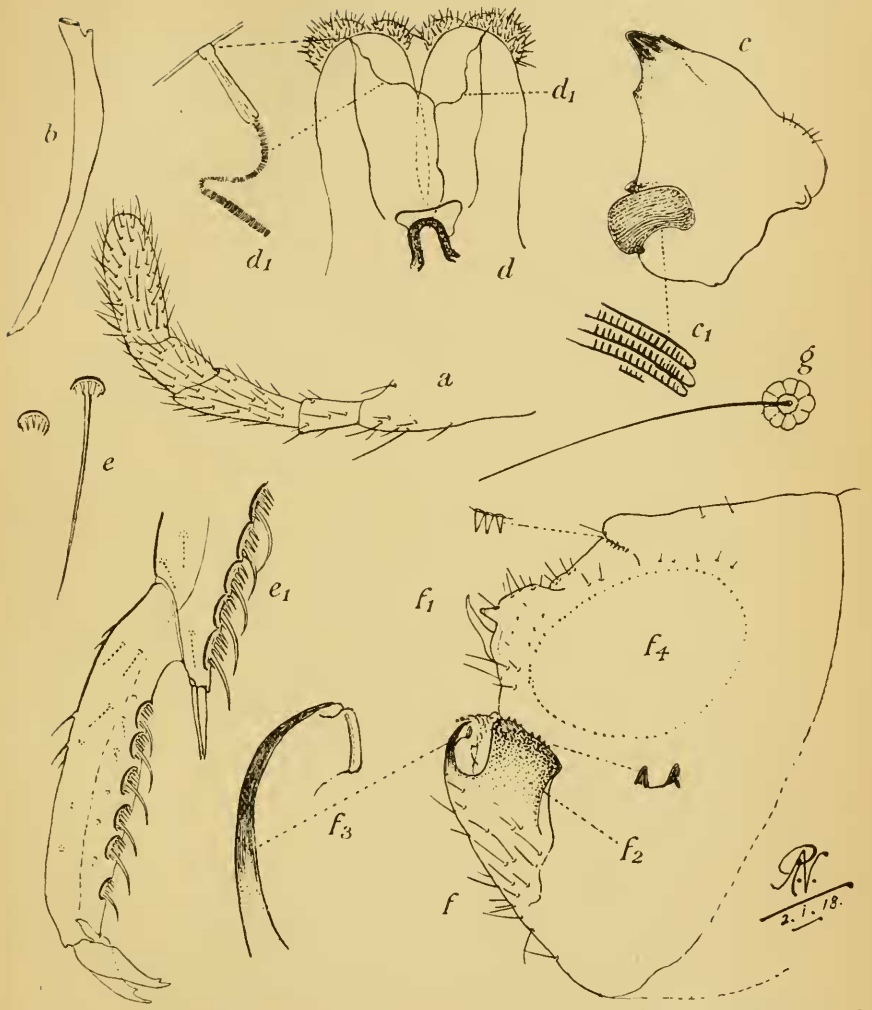
22.ix.17. See pp. 418–20 for an account of the habits of this and two other species.

This somewhat remarkable species is nearly allied to *Psocus kiboschoënsis* Enderlein;* but the fore-wings are much longer and the structural characters of the pygidium of the female, together with the greater number of "ctenidiobothrien" on the tarsi, readily distinguish it.

* Der Schwedischen Zool. Exp. Kilimanjaro-Meru; 3B, p. 31, taf. 5, figs. 2, 8 (1910).

Explanation of Plate XI.

Psocus nigeriensis Newst. ♀: *a*, maxillary palpus; *b*, maxillary process; *c*, mandible; *c*1, compound tooth-plate; *d*, lingua; *d*1, chitinous chord; *e*, compound spines (ctenidiobothrien); *e*1, tarsus with the ventral compound spines; *f*, pygidium in profile; *f*1, spine-like processes; *f*2, one of the quadrate sclerites; *f*3, median sclerite; *f*4, the dotted ovate line indicates the position of one of the faecal pellets. *g*, ♂: rosette-like platelette and hair on the anal lobes.



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PSOCUS NIGERIENSIS Newstead.

B. HYMENOPTERA.

III. *On a new Joppine (Ichneumonidae) Genus and Species bred from a Lycaenid Larva in Southern Nigeria.* By James Waterston, B.D., D.Sc., Assistant in the Department of Entomology, British Museum, Natural History.

Text Figures 2, 3.

The single Ichneumonid in Mr. Farquharson's collection, though represented by only one example with defective antennae, has proved to be of great interest. A prolonged study of this specimen convinced me that it must be assigned to the Joppinae, and further that it was referable to no described genus. At my request Dr. A. Roman of Stockholm examined the insect, and his opinion as to its systematic position agrees with that just expressed. For this kindness and further for drawing my attention to the importance of the host attachment (*vide infra*) of this new genus I desire to express my hearty thanks.

The genus *Adelotropis* (*ἄδηλος*, *τρόπις*) is easily recognised by antennal and neurational characters and the genotype in all probability by colour and puncturation.

Fam. ICHNEUMONIDAE.
Sub-fam. Joppinae.

Adelotropis, gen. nov.

Head as wide as thorax. Frons smooth, without carina between the antennae. Face medianly raised, the swelling defined with moderate sharpness just below the toruli and fading out towards the clypeus. The latter not separated from the face medianly but shallowly at the sides (towards the ends of the tentorial apodemes). Inner orbits a little divergent towards the mouth edge. Occiput and genae smooth. The latter slightly swollen posteriorly so that in profile the genae are not margined. The occipital margin, fine but distinct and thinning out ventrally, reaches the mouth edge as a delicate line perceptible only from behind. The first normal funicular joint (post annellus) shorter than the second which is longer also than its successors. Thorax robust; notauli shallow and indistinct; scutellum deeply separated from scutum and bluntly, conically, elevated with a broad raised flange which is apically defective. Propodeon dorsally short, deeply separated

from postscutellum, its areae almost completely but in places indistinctly indicated. Spiracles rather narrow. Wings. The outermost (3rd) abscissa of the radius is straight and the 2nd recurrent broken just below ½ and with a rudimentary external branch. In the hind-wings the nervellus is very slightly antefurcal and broken at its lower extremity. The discoidella emitted here and the posterior beyond this point are spurious.

Abdomen, 2nd segment with pronounced punctate striate sculpture; gastrocoeli large. Hind-legs, especially the femora, robust, tarsal ungues strong, simple.

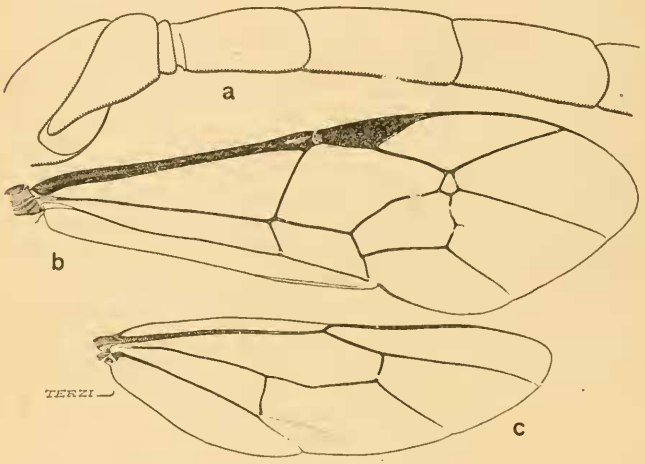


Fig. 2. *Adelotropis farquharsoni*, sp. n., (*a*) Basal joints of antenna, (*b*, *c*) Wings.

In its genal characters this genus closely resembles *Joppa* F., but its affinities on the whole are with the genera *Anisobas* Wesm., *Listrodromus* Wesm., and *Neotypus* Först., particularly with the latter. A further indication of the relationship of these four groups is to be found in their host attachment—all of them parasitising Lycaenids.

Genotype the following.

Adelotropis farquharsoni, sp. n.

♀. Head and antennae, up to the 8th normal funicular joint, blackish brown except for one large pale spot at the base of the mandible, a second along the inner orbit of the eye extending

upwards to the level of the anterior ocellus and inwardly to the edge of the torulus and a third narrow and indistinct along the posterior orbit on its upper $\frac{1}{3}$. Thorax dark ferruginous, propodeon more infuscated especially antero-dorsally. Legs and abdomen blackish brown, the fore and hind tarsi slightly paler. Apex of

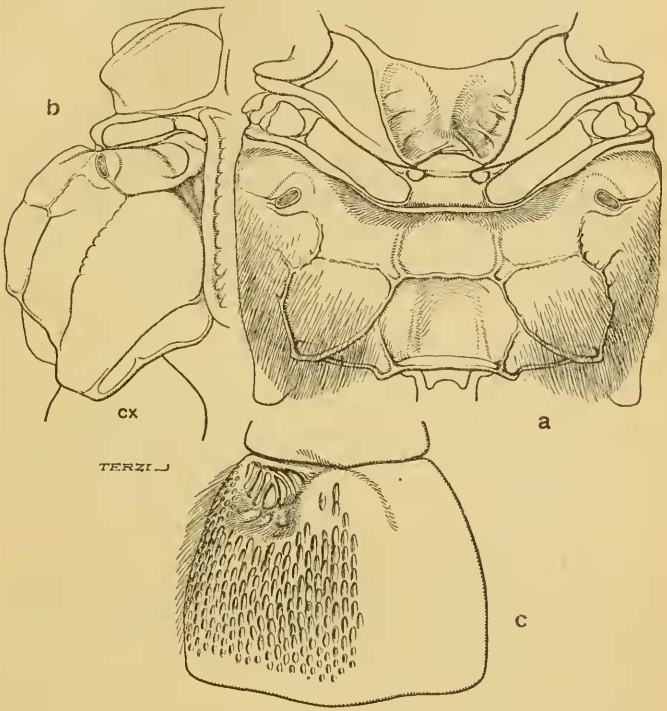


Fig. 3. *Adelotropis farquharsoni*, sp. n. (*a*) Propodeon from above, (*b*) Propodeon in profile, to show the areae. The puncturation is not expressed. (*c*) Post petiole and succeeding tergite, to show puncturation of the latter. (*cx*) Coxa.

hind coxae and hind tibial spurs pale. The abdominal tergites from 4 onwards broadly yellowish white apically, as is also the upper half of the sheath of the terebra.

Head, occiput to genae shining with only a few scattered punctures behind the ocelli; vertex with a few punctures (minute) anteriorly at the sides of the ocellar triangle. Frons smooth and finely and sparsely punctate at the sides on the pale spots. Face and clypeus dull, closely and finely punctate.

Thorax. Mesonotum (including scutellum) with rather large coarse sparse but even puncturation. Mesosternopleurae more closely punctate; upper part of furrow smooth: posteriorly before the epimeron, it is crenulate. Metapleurae deeply sunk. Propodeon. With care all the areae can be made out but the best-defined keels are those bounding the dentiparal area which postero-laterally bears a low inconspicuous tooth best seen from above (fig. 3*a*). Fairly distinct too are the keels above and below the pleural area (fig. 3*b*).

Basal area and areola confluent and nearly merged with the external areae. The dorsal surface of the propodeon within these areae shining and smooth but irregular, such punctures as are present being near the sides of the areae. Juxta-coxal, pleural, spiracular and posterior areae dull, with coarse close puncturation. Particularly at the sides and posteriorly (*i. e.* over the punctured surfaces) the propodeon is clothed with a dense whitish pubescence.

Wings (see fig. 2*bc*). About 10 hooks on the costa of the hind-wings.

Legs. Hind coxae externally coarsely and closely, the hind femora more finely, punctured.

Abdomen. Petiole smooth shining expanding distally to the wide post petiole. The latter intumescent between and round the small broadly oval spiracles. On the petiole itself are a few elongate punctures deeper anteriorly than posteriorly: apically the punctures become more numerous and coarser especially beyond the spiracles at the sides.

The 2nd (3rd) segment (fig. 3*c*) has a deep coarse puncturation, the punctures for the most part drawn out and deeper anteriorly so that the surface has a sub-aciculate appearance. The 3rd (4th) tergite is similar to the second and also basally crenulate. The remainder of the dorsal surface is smooth.

Length, about 8 mm.

Alar expanse, about 14 mm.

One ♀ bred March 22, 1917, from the larva of a Lycaenid, probably *Deudorix diyllus* Hew., feeding on the flowers of *Pterocarpus esculenta*, at Moor Plantation, near Ibadan, S. Nigeria (p. 382).

IV. *On Chalcid Parasites bred from Pupae of Teratoneura isabellae.* By James Waterston, B.D., D.Sc.

[In a letter of Oct. 18, 1917, Farquharson spoke of sending "two *Teratoneura* pupae from which Chalcids of two kinds emerged. I have more in reserve." (See also his notes on pp. 346–47.) Of the pupae sent, one, A, had yielded, on March 5, 1917, 245 minute Chalcids; from the other, B, found Feb. 21, 1917, a single large female, identified by Dr. J. Waterston as *Chalcis* ? *leighi*, emerged March 2. The material in reserve arrived later and consisted of 152 minute Chalcids, which emerged Feb. 20, 1917, from a pupa, C, which was not received. These 152 examples were larger than those from pupa A, but considered by Dr. Waterston to belong to the same species *Tetrastichus balteatus*. That the 245 should be smaller than the 152 was to be expected, but that the proportion of males in the larger number should be so much higher (2 to 5 as against 2 to 17) suggests further inquiries which may lead to conclusions of much interest. Dr. Waterston has kindly written (Sept. 18, 1919, and Feb. 29, 1920) the following account.—E.B.P.]

re *Chalcids from* Teratoneura.

There are in this material two species :—

(*a*) *Eulophidae*—Genus *Tetrastichus*.

Tetrastichus balteatus Waterst. (Bull. Ent. Res. VI, Pt. III, Dec. 1915, p. 241, figs. 4, 6).

Of this species there are [altogether from pupae A and C] 86 ♂ and 311 ♀ (*i. e.* 21·66 % of the total—397) which agree well with the type material bred from the pupa of a Lymantriid moth, Port Herald, Nyasaland. There are some slight differences in the proportion of the funicular joints (♂) which do not appear to be of specific value.

I cannot discover that more than one species is represented. The difference in size which struck you is partly sexual, the female being on the average considerably larger than the male, partly also I believe a matter of nutrition. Sorting the material roughly by size there are two lots of

larger and smaller examples respectively. These lots analyse as follows :—

	Mounts.	♂	♀	
Larger examples .	12 "C"	16	136	*i. e.* 2 ♂ to 17 ♀
Smaller examples .	12 "A"	70	175	*i. e.* 2 ♂ to 5 ♀
Totals . . .		86	311	

I take it that "C" and "A" refer to separate pupae of *Teratoneura*. If so the difference in size is apparently due to the fact that in the A lot not only was the parasitism heavier but the ratio of males to females over three times higher.

(*b*) *Chalcididae*—Genus *Chalcis*.

Chalcis ? *leighi* Cam. (Ann. S. Afr. Mus., vol. v, 1907, p. 210). One ♀ from pupa B.

Cameron's species rests on the unique and imperfect type in the B. M., and a complete comparison has not been possible. In your example the puncturation of the hind femora is hardly so heavy, nor is the base of the hind tibia so pale above as in the Natal insect. But the two are extremely close if not identical, as I incline to think they will prove to be.

C. LEPIDOPTERA.

V. *Description of new Species of Lepidoptera, chiefly Lycaenidae from Southern Nigeria, and one from Damba Island, Victoria Nyanza.* By G. T. Bethune-Baker.

a. Lipteninae.

Epitola lamborni, sp. n.

♀. Primaries, upperside, costa broadly dark ash-grey, termen broader and darker grey, cell and basal three-quarters of fold covered with very pale blue scales over a whitish ground which shows through as a white spot beyond the end of the cell and as three or four larger spots in the postmedian area; there is a blackish blotch beyond the lower angle of the cell and another at the upper angle; these are more narrowly confluent between veins 4 and 5. Secondaries pale ash-grey with the basal and median areas between veins 1 and 6 covered with very pale blue scales. Fringes whitish with the veins darkly intersecting.

Underside, both wings white with grey markings. Primaries with three spots in the cell, a grey area all round the cell with a good deal of white scaling over it, this grey area is projected right outwards between veins 3 and 4 but recedes somewhat basewards, above vein 4 it recedes and is sharply crenulate, a very irregular white area follows and is succeeded by two rows of very pale grey crenulate markings obsolescing towards the tornus. Secondaries with a basal grey dash, two sub-basal grey spots across the cell, beyond which is a series of about 5 confluent spots across the middle of the cell which is closed by a narrowish dash with a whitish centre, most of the spots have also more or less whitish centres; beyond the cell a very irregular crenulate area of grey and whitish, an irregular broadish clear whitish area follows and is succeeded by two submarginal crenulate grey lines with whitish filling between; termen finely grey.

Expanse 40 mm.

Hab. Moor Plantation, near Ibadan, S. Nigeria.

Type in the Oxford Museum.

I name this after the wonderfully assiduous and able naturalist who bred it on Oct. 29, 1913, from a pupa found two days earlier.

Epitola carpenteri, sp. n.

♂. Upperside, both wings dark brown with the basal and median areas quite covered with somewhat lustrous darkish blue scales which extend almost to the termen in the secondaries. Underside, primaries brown with the median area dark grey and in the postmedian area there is a well-defined paler area crenulate at its inner margin in the fold, whilst beyond the cell is a trace of two small paler spots which are separated from those on the fold by a dash of the dark ground-colour. Secondaries uniformly brown.

♀. Upperside, primaries dark brown, below the cell whitish with a slight superimposition of very pale blue scales, a largish white spot between veins 2 and 3 in the postmedian area, and an oblique series of small white spots in the same area just below the costa. Secondaries pale grey with bluish scaling in the basal and median areas. Underside with the bluish and white areas and spots repeated in white, the postmedian spots being separated by a broad dash of the blackish ground-colour about vein 4, otherwise like the male.

Expanse ♂ 38, ♀ 34 mm.

Hab. Damba Island, N.W. Victoria Nyanza, about 20 miles S.E. of Entebbe: ♂—jungle, E. side of island, between Sept. 1 and 15, 1911: ♀—on shore, E. side, July 14, 1911. Mar. 16–May 31 was much the wettest part of Dr. Carpenter's visit, from Mar. 16 to Dec. 22.

Types in the Oxford Museum.

I name this species after its captor. At first I was almost inclined to consider it was a form of *E. cephena* Hew., but further comparison makes me feel it cannot be so.

b. Lycaeninae.

Epamera farquharsoni, sp. n.

♂. Upperside, both wings lustrous bright azure blue. Primaries with the blue area rounded off so as to leave the upper end of the cell black and not extending into the tornus, it thus leaves the tornus and the apical half of the wing deep black. Secondaries entirely blue except the costa which is grey from vein 6, a large shiny leaden grey roundish sexual patch occupies the cell and somewhat around it. The apex of the wing is narrowly black with a linear black termen. The two tails are black tipped with white whilst the lower longer one is fringed with white as well. Underside, both wings pure white. Primaries with a trace of a straightish

very fine grey postmedian line to vein 2, a very large patch of black sex hairs from the inner marginal lobe. Secondaries with a fine distinct dark grey postmedian line, consisting of curved internervular dashes more or less confluent below vein 2 angled and receding to the inner margin, a yellowish submarginal line, a black spot in orange between veins 2 and 3, and another spot on the anal lobe surrounded with carmine and with broad red internal edging and also with a trace of mauve metallic scaling.

♀. Upperside, primaries with the black area smaller in proportion and the blue area much less brilliant and paler fading into whitish at its outer margin. Secondaries with the blue as in the primaries not lustrous and much paler, and with three small marginal anal black spots with orange internal edging. Underside, both wings as in the male but the markings more definite.

Expanse ♂ 38, ♀ 42 mm.

Hab. Moor Plantation, near Ibadan, S. Nigeria.

Types in the Oxford Museum, 2 ♂ 7 ♀. All were bred from larvae feeding on flowers of *Loranthus incanus* parasitic on *Funtumia elastica* (see pp. 362–63).

Deudorix odana H. H. Druce.

♀. Upperside, both wings dull lavender grey with broad dusky external margins. Underside, just like the male but whiter.

Expanse 44–46 mm.

Two examples, bred by Farquharson at Moor Plantation.

There appear to be two forms of this species in both sexes. In the Farquharson specimens the undersides are white, the females even whiter than the males. On the upperside the Farquharson females are grey. In my own collection the under surface of the male is dark grey, whilst my two females are uniformly brown above and pale stone-grey beneath, the pattern in both cases being typical. My specimens are from Sierra Leone and the Cameroons.

[After hearing of the above-described variation in colour, I sent two of the most divergent of Lamborn's males from Oni to Mr. Bethune-Baker, who compared the armatures with those of his own forms and found all precisely the same.—E.B.P.]

I have been unable to find any record of a description of the females of this and the two following species, and as there are specimens of all, bred with their males by Farquharson at Moor Plantation, near Ibadan, S. Nigeria (see pp. 378, 381), it is well to make the record.

Deudorix (Pilodeudorix) diyllus Hew.

♀. Upperside, both wings uniform dark brown with pale grey fringes. Underside, stone grey with the markings narrow exactly like the male.

Expanse 31–34 mm.

Deudorix (Pilodeudorix) camerona Plötz.

♀. Upperside, both wings dark brown with the basal half having a somewhat leaden tinge. Underside, pale brownish (not the cold leaden grey of the male) with all the markings precisely as in the male but slightly larger. Fringes darkish grey.

Expanse 35–38 mm.

c. Heterocera: Lithosiinae.

Chionaema farquharsoni sp. n.

♀. Upperside, white. Primaries with a sub-basal curved scarlet stripe, median scarlet stripe slightly curved, postmedian stripe very slightly angled below the second black spot and from there inclined outwards; termen scarlet broadish in the apical area, two black spots, the first in the cell, beyond the middle, and the second at the end of the cell.

Expanse 25 mm.

Type in the Oxford Museum, a female bred 1916–17 from a cocoon found on the *Cremastogaster* ant-tree, *Alstonia congensis*, at Moor Plantation.

This appears to be near *Chionaema pretoriae* Distant. The cocoon is ovate in shape, and is entirely covered, hedgehog fashion, with a dense clothing of fine long hairs which are pennate, consisting of a main quill from which emanates on each side a series of fine hairs (see also p. 488).

VI. *Notes on two Lipteninae collected by C. O. Farquharson.*

By Prof. E. B. Poulton, F.R.S.

a. The Mimetic Pattern of Teratoneura.

At the time when the first specimen (p. 339) was received, the only example that I knew of in any collection was the male type of *isabellae* Dudgeon, in the British Museum. The arrival of the female made possible the full consideration of the probable bionomic significance of the pattern. The upper surface is clearly mimetic of the male *Planema epaea* Cram., which is the primary model of several other species. The female *Teratoneura*—having somewhat smaller, less reddish, paler orange markings, with comparatively dyslegnic borders—is a better mimic than the male. In addition to the mimicry of the male *epaea*, this Lycaenid appears also to exhibit secondary resemblance to certain other species of *Lipteninae*—to the female of *Telipna acraea* Westw., the male of *Mimacraea fulvaria* Auriv., both male and female *M. dubitata* H. H. Druce, and more distantly to the male of *M. apicalis* Sm. and Kirb., with a pale subapical bar to the fore-wing.

Farquharson wrote on Feb. 28, 1917, concerning the mimicry of *Teratoneura*: "Although the upper-surface colours are rather Acraeine-like, I have not observed any Acraeines near the tree nor any of those whose flight is anything like as rapid as that of the Lycaenid. When at rest the wings are folded and the lower wings take up rather a curious position so that their tips project above the line of the anterior pair. The poise is on the whole rather Skipper-like."

Although it is usual for models and mimics to frequent the same type of country and to be found flying together, examples of forest species mimicking those of more open country are well known. The flight of a mimicking species is commonly more rapid than that of its model.

b. The Synonymy of Citrinophila tenera Kirby. The Patterns of the Sexes differ as do those of the Model, Terias. J. Röber's recent Criticisms.

As there is a fine series of 31 males and 14 females of this form at Oxford, nearly all captured at Oni by Mr. W. A. Lamborn, it seemed advisable to take this opportunity of clearing up the synonymy. By the kind-

ness of Mr. J. J. Joicey I have been permitted to study the four Kirby types in the Grose-Smith collection—*limbata* and *marginalis*, both males, from the Cameroons, *tenera* and *similis*, both females, from Gaboon and Ashanti, respectively. Aurivillius ("Rhop. Aethiop.," p. 269), considers *limbata* a synonym of *tenera*, and *marginalis* of *similis*, which also "= ? *tenera*." Dr. Eltringham and I entirely agreed with this last suggestion which would sink the other three names to *tenera*. We had not the slightest doubt that all four are conspecific and only differ in variable features of the pattern. In fact so far as the male types are concerned there was no difference at all worth mentioning, both types coming from the same locality, *marginalis* being slightly the larger and paler of the two, the latter distinction apparently due to its being a little more worn. The two female types differ in a variable feature—the black margin of the hind-wing upper surface—that of *tenera* being narrow and interrupted, forming a beaded *Mylothris*-like border, the beads developed at the ends of the veins, the interruptions internervular. The under surface of both wings is similarly beaded, but this is a common feature in all forms of the species. The name *similis* may be conveniently retained for female forms of *tenera* with the black margin of the hind-wing upper surface continuous and not beaded. This form is evidently much commoner than the type, and 13 out of the 14 Oni females belong to it, the 14th, with its black margin reduced to scattered dots but not beaded, being transitional to the *tenera* ♀ form. The whole of the 31 males are fresh, bright specimens, precisely like the type of *limbata* except for the absence in the latter of a small central black spot on the hind-wing under surface. In fact, the Oxford series entirely supports Aurivillius' conclusions. There is no doubt that the four types of Kirby are a single species, and that all the Oni males are *limbata* (a synonym of *tenera*), while all the females but one are the *similis* ♀ form of *tenera*, the exception approaching the *tenera* ♀ form.

When a long series of males and females of *Citrinophila tenera* are compared together certain extremely interesting differences are revealed. In the females the orange ground-colour is paler and yellower, the black margin of the fore-wing upper surface does not extend along the basal section of the costa (noted by Eltringham in "African Mimetic

Butterflies," Oxford, 1910, p. 89), and the black margin of the hind-wing upper surface is narrower. In other words the differences are those commonly characteristic of the genus *Terias*, viz. of the Pierine models.

J. Röber in an article on mimicry (Entom. Mitteilungen, vol. x, nr. 1, Jan. 5, 1921, p. 23) disputes Doflein's conclusion (Hesse and Doflein "Tierbau und Tierleben," vol. ii, 1914, pl. ix) that *Terias* is the model of *Citrinophila*, because the special protection of *Terias* has not yet been proved, and because of the difference in size. But such a difference between model and mimic is common and unimportant; for, as Mr. F. A. Heron has pointed out, apparent size is determined by distance (Proc. Ent. Soc., 1903, pp. lxv, lxvi). Furthermore, the resemblance deceives the insects themselves; for one of the Oni males referred to on p. 465 was observed by Lamborn, on Aug. 5, 1910, to be eagerly pursuing a male of *Terias senegalensis* Boisd., and both were taken in a single sweep of the net. Although this *Terias* is not so good a model as *brigitta* the two insects would closely resemble each other on the wing. The correspondence between the patterns of the sexes referred to above supplies further evidence of mimetic association.

I have now had the opportunity of studying Doflein's plate, and find that the figures of *Citrinophila similis* and its model *Terias brigitta* Cram. are copied from Dr. Eltringham's work, published in 1910 (*ibid.*, p. 89, pl. ix. figs. 27 and 22, respectively).

Dr. Dixey has kindly written the following note on the mimicry of *Citrinophila tenera* :—

"Of the three common species of *Terias* which occur in the same locality as Mr. Lamborn's specimens of *Citrinophila tenera*, viz. *T. brigitta* Cram., *T. regularis* Butl., and *T. senegalensis* Boisd., the resemblance is closest to *T. brigitta*. The correspondence between the male Lycaenid and the male Pierid is remarkably exact; that between the respective females is also quite good, but in this latter case there are some interesting differences. The aspect of *T. brigitta* ♀ varies according to season, and the aspect of *C. tenera*, ♀ f. *similis* presents features which belong to the wet phase of *T. brigitta* ♀ together with some that are characteristic of the dry. The dark border to the hind-wing in the *similis* ♀ suggests the 'wet-season' phase of *T. brigitta* ♀, while the uniform

yellow of the ground-colour, and absence of dusky irroration, are marks of the 'dry-season' phase. The *tenera* ♀ on the other hand, with a greatly reduced hind-wing border, resembles the dry phase of the model in this as in the other respects. It appears, however, to be far less common than *similis*, at any rate in the Lagos district.

"It may perhaps be said that on a rapid glance an average *similis* ♀ of *C. tenera* would pass muster as either a 'dry' or a 'wet' *T. brigitta* ♀. The yellow of the female *Terias* is usually paler than that of the male at all seasons, and the yellow of the female Lycaenid tends similarly to be paler than that of the male, but to a less extent. The absence of the dark costal border to the fore-wing, passing inward from the dark apex, is characteristic of the female of both species. The yellow of *Citrinophila*, being slightly tinged with ochre, is hardly so brilliant as that of *Terias*, but there can be little doubt that it would be difficult to distinguish the two insects when flying, or even when settled.

"The upper surface of the yellow examples of the larger species of *Citrinophila* (*C. erastus* Hew., or probably a closely allied species or subspecies), captured by Lamborn at Oni, differs in size and shape and to some extent in colour from *C. tenera*. In all these respects it approaches the aspect of *Terias regularis* Butl., a near ally of *T. brigitta*. The under surface of this *Citrinophila* resembles, strongly in the female but less so in the male, a pattern common in the Pierine genus *Mylothris;* and the same is true of the upper surface as well as the under of the creamy white female of typical *erastus*, although the yellow upper surface of its male is mimetic of *Terias*. The resemblance of the white female to *Mylothris* was described by Eltringham in 1910 (*ibid.*, p. 90, pl. ix, fig. 30). See also Proc. Roy. Soc., B., vol. 91, 1920, pp. xxiv, xxv.

"The general resemblance of *Citrinophila* to *Terias* extends also to *T. senegalensis*, but is much less obvious in this case than in the other two.

"It is worthy of note that *Liptena flavicans* Sm. and Kirb., specimens of which are also in Mr. Lamborn's collection from Oni, at once recalls the dry-season female of *Terias brigitta*, though the brownish-ochreous hue of the former insect is dull in comparison with the clear yellow of the latter."

VII. *The polymorphic Females of Cymothoe theobene Dbl.-Hew. The Specimens captured, and Families bred from known Female Parents by W. A. Lamborn.* By Prof. Poulton.

It is exceedingly interesting that Farquharson should have repeated at Moor Plantation in 1915 the breeding experiments conducted by Lamborn at Oni, 70 miles E. of Lagos, in 1912. No account of these results or of Lamborn's captured specimens has hitherto appeared, and, inasmuch as they add another and very striking example to the list of butterflies with polymorphic females, I take this opportunity of describing them. The new female forms, which are very variable and are transitional into one another, may be grouped as follows :—

A. Lutescens, ♀ f. n.

The white median band of F. and H.W.s of the *theobene* ♀ is more or less invaded by orange, which also often appears around the blackish spots of the irregularly curved row distal to the band and around the spots of the submarginal lunulate line. The black-brown basal area of both wings also acquires a yellowish tinge, and, in the darker examples, the sharpness of its distal edge is obscured. The orange may perhaps be explained by transference from the male, but it is commonly accompanied by dark pigment, the two together producing an appearance altogether different from the *theobene* ♀. The *lutescens* form is transitional on one side into *theobene* and on the other, by increase in the dark pigment, into the following :—

B. Nigro-lutescens, ♀ f. n.

In this form the dark pigment tends completely to overspread the white area of *theobene*, in both wings. Combined with it the orange, becoming very faint in the darkest examples, occupies the positions described above. In spite of this increasing faintness accompanying

increasing darkness, the *nigrescens* forms, without the orange, are less dark than the majority of *nigro-lutescens*. The most extreme example of the latter (No. 8, p. 471) appears as an almost uniformly blackish butterfly with a faint yellow tinge in the region of the median band and one still fainter, indeed evanescent, in the more distal areas.*

C. Nigrescens, ♀ f. n.

In this form the dark pigment invades the white median band to a variable extent, in pronounced examples nearly obliterating it, in others replacing it by grey. In many specimens this invasion is strong in F.W., slight in H.W. As already stated, the pigment is less dark in this form than in *nigro-lutescens*, and the distal edge of the basal area and the spots of the curved and lunulate lines are more distinct than in any other form except *theobene* and the palest *lutescens*.

The under surface of the three forms usually differs but little from that of *theobene*. There is commonly an emphasis of the dark pigment, pronounced in the extreme forms, especially along the shadow-like outer border of the midrib-like stripe.

Lamborn's captured specimens, together with Farquharson's two bred varieties (p. 403), are arranged below, each set of forms in the order of increasing darkness.

* It is interesting to note that parallel female forms are found in the allied S. African *C. alcimeda* Godt., as recognised by Trimen in "South African Butterflies," 1887, i. p. 314. In a series of 4 ♂, 9 ♀ captured by the Rev. K. St. A. Rogers at Eland's Kop (about 5000 ft.), about 30 miles S.W. of Pieter Maritzburg, March 12–21, 1919, 6 ♀ have the median band of the creamy colour described by Trimen on p. 313 (where the sign ♀ is accidentally replaced by ♂). The tint is deeper in F.W., and in one example may be described as pale yellow—as also in a ♀ from Llabisa, E. Centr. Zululand. In the remaining three Eland's Kop ♀ the yellow tint is greatly deepened in both wings, being pale ochreous in one, deep ochreous in the second, and nearly obliterated by fuscous in the third. There is a less strong fuscous invasion of the band in the two former, and all three may be considered forms of *nigro-fulvescens*, the third being very near *nigrescens*. The Eland's Kop examples are small, the females varying from 52 to 56 mm. in expanse, the males from 46 to 52.—E. B. P.

1. *Lutescens* ♀ f. : Oni. May 25, 1910. Orange tinge faint.
2. ,, ,, ,, Oct. 11, 1910. (Type.) Capt. *in cop.*
3. ,, ,, ,, May 27, 1910.
4. ,, ,, ,, July 18, 1912.
5. *Nigro-lutescens* ♀ f. Bred by Farquharson (p. 403) at Moor Plantation, Aug. 21, 1915. (Type.)
6. ,, ,, Oni. Aug. 7, 1910.
7. ,, ,, Oni. Dec. 1, 1908–Dec. 3, 1909.
8. ,, ,, Bred by Farquharson (p. 403) at Moor Plantation, Aug. 4, 1915. By far the darkest form with much the strongest "shadow" to midrib stripe on underside.

Then follow the *nigrescens* ♀ forms in the order of increasing darkness, but it must be remembered, much less dark than the majority of *nigro-lutescens*.

9. *Nigrescens* ♀ f. : Oni. Emerged Mar. 24, 1911, from pupa found Mar. 23. (Type.) Median band grey in F.W. nearly white in H.W.
10. ,, ,, ,, April 25, 1910. On black sticky exudation fallen from tree. Median band grey in both F. and H.W. Strong "shadow" to midrib stripe on underside.

All three forms fly with *theobene*, and there is no evidence of any local or seasonal difference between them. Thus half the individuals of the above list were taken in the forest up to a mile to the E. of Oni in 1910, while 7 examples of the *theobene* ♀ were captured in the same area between April 16 and June 5 of the same year. On May 25 and again on May 27 a *lutescens* (Nos. 1 and 3 respectively) was taken with a *theobene*. The wet season in 1910 had well set in by about April 25.

The table on p. 472 shows clearly the results obtained by Lamborn in his three breeding experiments; and here too in Fams. B and C, as well as in Farquharson's (p. 403), the *theobene* ♀ appears with one or more of the new forms.

Mendelian heredity is suggested by Fam. A, where all the female offspring are of the same form and all different from the female parent. It is to be hoped that breeding experiments may be repeated and carried far enough to test this suggestion. Considering the rarity of these new forms in collections it is remarkable that so many should have appeared in the four families recorded here and on p. 403.

Oni, 70 m. E. of Lagos: 1912.	Date of pupation.	Date of emergence.	Males	Females, *Theobene*.	Females, *Lutescens*.	Females, *Nigro-lutescens*.	Females, *Nigrescens*.	Remarks.
Family A, from ♀ parent (No. 767), *a worn lutescens f. like* (1) *but orange stronger in H.W. median band*; capt. in forest, 1 m. E. of Oni, Apr. 11; ova laid Apr. 13–17; died Apr. 19.	Apr. 27	May 4	1					
	,, 27	,, 5	2					
	,, 28	,, 5	3				3	♀♀ similar to type.
	,, 29	,, 6	2				2	,, ,, ,, ,,
	,, 30	,, 7					3	2 ♀♀ ,, ,, 1 w. darker H.W., like (10).
	TOTALS . .		8				8	
Family B, from ♀ parent (No. 768), *a typical theobene form*; capt. in forest 1½ m. E. of Oni, Apr. 13; ova laid Apr. 13–15; died Apr. 18.	Apr. 27	May 5	1					
	,, 28	,, 5	5			1		♀ slightly darker than type.
	,, 29	,, 6	3	1				
	,, 29	,, 7		1			1	♀ *nigrescens*, a dark var.
	,, 30	,, 7	1					
	TOTALS . .		10	2		1	1	
Family C, from ♀ parent (No. 771), *injured before capt., but probably a pale nigrescens f.*;* capt. in forest 1½ m. E. of Oni, Apr. 13; ova laid Apr. 13–14; died Apr. 15.	Apr. 28	May 6	1					
	,, 29	,, 6	3	1				♀ trans. towards *lutescens*.
	,, 30	,, 7	1					
	May 1	,, 8	2					
	,, 2	,, 9				1		♀ similar to type but brighter orange.
	No record.	,, 9		1			1	♀ *nigrescens*, a dark var.
	TOTALS . .		7	2		1	1	

* Very worn and the H.W.s nearly gone. Apparently a *nigrescens* f., very pale in the F.W.s, darker in the H.

VIII. *On the Larvae and Pupae of Lepidoptera, chiefly Lycaenidae, collected by C. O. Farquharson, W. A. Lamborn, and the Rev. Canon K. St. A. Rogers.* By Harry Eltringham, M.A., D.Sc.

Plates XII, XIII. Text Figures 4, 5.

The accompanying figures of larvae and pupae have been drawn from examples in the Hope Department at Oxford. The acquisition of Farquharson's specimens provided an opportunity of reviewing the whole of the material at our disposal, including the valuable contributions received from Mr. Lamborn and the Rev. Canon K. St. A. Rogers. It must be understood that as regards the pupae, in nearly every case the cuticle only has been available, the imago having emerged. The drawings are thus in the nature of restorations, and slight errors of shape may have occurred in those which were in a less perfect condition. The original colours have not been preserved and it is only possible to refer to the markings as light or dark, except in a few cases where they are described in the collector's letters.

a. Lipteninae.

Aslauga lamborni Bethune-Baker. Plate XII, figs. 4, 5.

Pupa. (Fig. 5.) A small much-contracted pupa attached by posterior extremity to a leaf, with the ventral surface in contact with the support. Chiefly remarkable for the presence on the pupa of chitinous growths of very remarkable formation. Such growths in one form or another are found on many Lycaenid larvae and pupae. They are of the same nature as the interlocking plates forming the armour of the larva of *Euliphyra mirifica* described by me, Trans. Ent. Soc. 1913, p. 509. As they are so marked a feature in Lycaenidae, and their structure is in many cases so elaborate, I propose the name *chitinanth*, a word kindly given me by Prof. Gilbert Murray to whom Prof. Poulton referred the matter. The meaning is of course "chitin flower" and is singularly appropriate. In the present species comparatively few remain on the pupa, but from an examination of the larval skin, it would appear that the larva itself is entirely covered with them.

One of the structures highly magnified is shown at Fig. 4. Length of pupa 8 mm. Lamborn, Oni. A ♀ emerged 3.2.12.

Euliphyra mirifica Holl. Plate XIII, fig. 3.

In an appendix to Mr. Lamborn's paper in our Transactions of 1913, I described (p. 509) the larva of this species, and the material then at my disposal suggested that the pupa was always partly enclosed in the old larval skin. (That of the Australian *Liphyra brassolis* Westw. is completely so enclosed, the larval skin forming a kind of puparium.) Further material shows that in this case the larval skin is not always, perhaps not generally, retained, since several examples are entirely without it. The pupa is attached by a sucker-like expansion of the terminal segments, and a depression of the abdominal segments forms a deep dorsal furrow. Its support is a leaf. On the thoracic region is a central ridge from which smaller ridges extend at right angles. The cuticle, especially of the abdominal region, is much folded and shrivelled. Length 19 mm. Lamborn, Oni. June–July 1912.

Epitola hewitsoni Mab. Plate XII, fig. 1.

Pupa. This remarkable pupa is attached by the terminal segments to its support and stands nearly at right angles thereto. Round the point of attachment are found remains of the larval skin, which was evidently clothed with long spines. The wing-cases have a beautifully marbled pattern, whilst the remainder of the cuticle bears dark irregular markings. The head has a blunt horn-like projection. the thorax has two prominent dorsal ridges, and there are large prominences on some of the abdominal segments. Scattered over the head and thoracic region and on various points of the abdomen are rounded tubercles from which arise thick curved spines. In nature the pupa is evidently extremely cryptic, its grotesque form doubtless serving to hide its outline more or less completely. Length 20 mm. Lamborn, Oni. 19.4.1910.

Epitola ceraunia Hew. Plate XII, fig. 3.

Pupa. A very pale pupa with a few black markings, notably on the wing-cases and the dorsal and lateral regions. The smooth prominent tubercles, which in the dry specimens are orange brown, form the most characteristic feature. From each of these projects a blunt spine. The greater part of the dorsal thoracic and abdominal areas sparsely set with very minute spines or setae. Pupa

attached posteriorly to a leaf. The larval hairs combined with those of the posterior pupal segments are attached to the leaf in radiate formation. Length 15 mm. Lamborn, Oni. Emerged 22.2.12.

Epitola miranda Staud.

Pupa. I have not figured this pupa since it so closely resembles that of *E. ceraunia* that a separate illustration seems unnecessary. It is attached by the terminal segments, which are themselves clothed with long white hairs, resting on a cushion formed from the old larval skin. The long axis of the pupa is at right angles to the plane of its support. The dark markings are less irregular than in *ceraunia*. The 2nd abdominal segment bears a black, bracket-shaped transverse streak. On lateral prominences of the abdominal segments are a few very small chitinanths, and from these prominences on the 2nd, 3rd and 4th segments, there arise long fine bristles, which instead of projecting, are curved round the wing-cases. This feature is not shared by the pupa of *ceraunia*. Length 15 mm. Lamborn, Moor Plantation. Emerged 6.11.13.

Epitola concepcion Suff. Plate XII, fig. 13.

Pupa. Very pale with a few dark markings as shown in the figure. Small lateral clusters of delicate hairs, and on head, thorax, and abdomen, tufts of long chitinous processes having flattened dentate extremities. A few short setae scattered sparsely over the cuticle, and much longer ones projecting from the terminal segments. Length 12 mm. The example figured produced a male which emerged 2.11.13. Lamborn, Moor Plantation.

Epitola honorius Fab. Plate XII, figs. 16, 17.

Larva. (Fig. 17.) Medium dark ground-colour with still darker markings forming a rather complicated pattern. (Farquharson describes the general colour as brown.) Each segment with four tubercles from which arise tufts of fine sharp spines, and also longer delicate branched hairs. The whole cuticle is sparsely covered with fine short hairs. Length 16 mm. Farquharson, Shagamu. 8.9.15.

Pupa. (Fig. 16.) Of the shape and appearance shown in the figure. A prominent and characteristic dark marking

on the thorax. Dorsal and lateral tubercles from which arise irregularly curved spines. Abdominal segments bear groups of chitinanths, each being surrounded by a dark ring on the cuticle. Dense hairs on the terminal segments combine with those of the larval skin to form a cushion round the point of attachment, the pupa lying nearly parallel to its support. Length 15 mm. Farquharson, Shagamu. Emerged 19.9.15.

Epitola ? sp. Plate XII, fig. 12.

Pupa. A small pupa the imago from which has not yet been identified. Dorsally the head bears two rather deep depressions, and the thoracic region is rounded and resembles a breastplate. Ground-colour very pale. A few slender black markings as figured. Numerous lateral tufts of chitinous projections gradually thickened towards their outer extremities, and having a dentate surface. Thoracic and abdominal surfaces sparsely clothed with very minute setae. A few longer setae projecting from the terminal segments. Length 12 mm. Lamborn, Moor Plantation. 6.11.13.

Epitola carcina Hew. Plate XII, fig. 18.

Pupa. Characteristically marked on thorax as shown in figure. The general surface sparsely clothed with fine setae. On thorax and abdomen tufts of short sharp spines, and on head, thorax, and abdomen lateral and dorsal groups of delicate chitinous projections which are white with black tips. Attached to leaf by terminal segments and lying nearly parallel to its support. Length 10 mm. The example figured produced a male, which emerged 8.2.12. Pupa, Lamborn, Oni. 7.2.12.

Teratoneura isabellae Dudgeon. Plate XII, figs. 7–9, 14, 15.

The general appearance of a dorsal view of the larva is shown at fig. 8. On each segment there are lateral and dorsal rows of tubercles from each of which arises a tuft of long fine hairs having the structure shown at fig. 15. The head and terminal segments are black, the former with a central pale streak flanked by two large pale spots. On segments 5 to 8 inclusive are dorso-laterally placed dark patches which consist of masses of urticating spicules. These are of the form shown at fig. 7. They are all slightly

curved, but whether this is natural or due to the immersion in the preservative fluid cannot at present be decided. The whole larva has a very "Lymantrid" appearance, and the presence of urticating spicules on a Rhopalocerous larva is a very remarkable feature. Farquharson describes the larva as brightly pigmented with red, green, and yellow, and perhaps other colours, such as one associates with Lymantrid caterpillars. Length of larva 18 mm. Farquharson, Moor Plantation.

Pupa. The extraordinary pupa, shown at fig. 9, is attached by the terminal segments to its support, and the remains of the larval skin form a cushion of radiating hairs. On the 5th and 6th abdominal segments there is a conspicuous dorsal patch of yellowish brown, and a similar one just behind the head. The whole thoracic and dorsal surfaces are densely covered with elaborate chitinanths, which in many places are white. The effect of this is very peculiar. It gives the pupa the appearance of being mouldy, a fact to which I called attention before I knew that Farquharson had observed the same appearance in nature (p. 340.) Until I examined the pupa microscopically I quite thought it was mould, and that the specimens would have to be cleaned. In addition to the general covering by these structures, there arise from various points long branched filamentous chitinanths as shown in the figure. These add to the mouldy appearance. Length 15 mm. ♂ emerged 9.12.17, at Agege, larva from Moor Plantation, Ibadan. C. O. Farquharson.

Iridopsis incredibilis Staud. Plate XII, figs. 6, 10.

Pupa. As will be seen from fig. 10, the shape of this pupa is quite unusual, its form gradually widening from the posterior to the anterior end. The cuticle is covered with chitinanths both stellate and annular, and also with long delicate filaments bearing plume-like expansions at their extremities. A small portion of the cuticle is shown at fig. 6 highly magnified. From the terminal extremities project tufts of long hairs which blend with those of the larval skin, forming a dense cushion at the point of attachment. The pupa lies flat with the ventral surface in contact with the bark. The larva was evidently clothed with silky hairs. There is a considerable quantity of silk on the bark, round the pupa, forming a kind of elementary cocoon. Length 12 mm. The example figured produced

a male which emerged 30.9.15. Farquharson, Moor Plantation.

Citrinophila tenera Kirby. Plate XII, fig. 11.

Pupa. This little pupa was attached to bark of the Pará Rubber tree on which it lay with the ventral surface in contact. The thoracic region, which is dark in colour, bears a prominent dorsal ridge, and along the whole length of the pupa are dorso-lateral prominences from which arise long branched hairs. The still longer hairs of the larval skin radiate in masses from the point of attachment. The general appearance is extremely cryptic. Length 7 mm. Farquharson, Agege. 18.10.17.

Hewitsonia similis Auriv. Plate XII, fig. 2.

Pupa. Ground-colour very pale with some very small black markings on wing-cases and black-and-white dots on the remainder of the cuticle. A darker " arrow head " pattern on the dorsal thoracic region. The black-and-white dots are really chitinanths of simple structure, flat and of reniform outline. From various points of the cuticle arise long needle-like spines, some of which are black and some white. The lateral portions of the abdominal segments are flattened and expanded, and the last four segments are separated from the rest by a constriction. The general appearance reminds one of some large species of Coccid. It is attached terminally to a piece of bark and lies flat upon it. Remains of the larval skin show it to have been clothed with long fine branched hairs. Length 17 mm. Lamborn, Moor Plantation. Emerged 28.11.13.

b. Lycaeninae.

Tanuetheira timon F. Plate XIII, figs. 5, 7, 11.

Larva. The drawing reproduced in fig. 7 must be regarded as to some extent diagrammatic, since from Farquharson's notes it seems doubtful whether the head and legs are in life so prominently displayed as in the sketch. The colour is described as " dull green," like the larva of *A. paneperata*. The larva may be described as onisciform, the dorsal portion forming a ridge segmentally divided into stiff plates, the upper edges of which are projected backwards so as

slightly to overlap. Anteriorly these plates form projections round a deep cavity the general arrangement of which can best be understood from the figure. The head in the preserved example is pointed vertically downwards, though this is probably not a natural position. The lateral parts of the segments form a kind of mantle which, when in close contact with the support, completely covers and protects the head, legs, and ventral surface. The last segment is prolonged into a bifid process. The larval cuticle is of comparatively enormous thickness and consists of a dense fibrous tissue carrying dorsally a number of small hooked spines. The surface of the cuticle, fig. 11, shows, under a medium magnification, a delicate tracery having a squamoid pattern, and fairly evenly distributed upon it are great numbers of chitinanths, resembling in shape single roses, in many cases bearing a partially or completely expanded chitinous tuft. As the tufts are easily broken it seems probable that normally they are always formed, and that where only the rose formation remains they have become detached. Length 16 mm. Farquharson, Moor Plantation. Dec. 1917–Feb. 1918.

Pupa. The pupa is shown, not quite complete at fig. 5. It is difficult in a mere black-and-white sketch to suggest its extraordinary resemblance to a bud. The terminal segments are progressively tapered towards the point of attachment, and the long axis of the pupa forms a sinuous curve giving it a most characteristic shape. Judging from the appearance of the dry skin, the original colour is green, somewhat darker towards the point of attachment. The central portion of the dorsal surface is also darker, as are the wing-cases, thus giving the lateral parts a close resemblance to the green part of the expanding bud. Length about 15 mm. Farquharson, Moor Plantation. Jan.–Feb. 1918.

Argiolaus paneperata H. H. Druce. Plate XIII, figs. 9, 18.

Larva. Fig. 9 shows the larva with head and feet retracted. It is really rather similar to that of the previous species, but differs in the much simpler structure of the anterior segments. Farquharson describes the colour as "a sort of mistletoe-leaf green," exactly resembling the immature flowers which are "dull green—a sort of bud-scale green shot with brownish hairs" (pp. 368, 372). The

cuticle, a surface view of which is shown at fig. 18, has the same squamoid markings, but the chitinanths are of a different type, being merely tufts without the elaborations shown in *timon*.

Pupa. All the pupa skins are much shrivelled, but it is evident that the abdominal segments differ from those of *timon* in being less rounded, and so forming a marked dorsal angle. The whole effect is less bud-like, and the pupa seems generally to be attached to a leaf instead of to a stem. The cuticle is smooth. Length 15 mm. Farquharson, Moor Plantation. Jan.–Feb. 1918.

Argiolaus iulus Hew. Plate XIII, fig. 4.

Pupa. The general shape of this pupa recalls that of *T. timon*, being somewhat bud-like, though it would appear usually to be attached to a leaf. The terminal segments are very narrow suggesting a stalk, and the last, though but little expanded, has the sucker-like formation noted in several other species. The dorsal area is covered with punctulations, and a very conspicuous feature is the presence on the fourth and fifth abdominal segments of two large yellow patches outlined in black. The thoracic portion of the skin is in all the specimens too distorted for accurate representation. It is noticeable that the pupa of *iulus* bears a greater resemblance to that of *T. timon* than to those of other species of its own genus. The example shown produced a male which emerged 25.2.17. Length of pupa 15 mm. Farquharson, Moor Plantation.

Argiolaus alcibiades Kirby. Plate XIII, fig. 2.

Pupa. This pupa does not present any very marked features of interest. As the figure shows, the dorsal aspect is somewhat coffin-shaped and the cuticle is finely granulated. Attached to support by a sucker-like expansion of the terminal segment. It is described as "apple or Alga green—not shining but dull green like the surface of a tomentose leaf." Length 18 mm. The example shown produced a female which emerged 23.1.18. Farquharson, Moor Plantation.

Argiolaus ? sp. (nr. **silarus** H. H. Druce). Plate XIII, fig. 1.

The pupa figured is somewhat like that of *iulus*, but the dorsal markings are more extensive and elaborate. The surface is comparatively smooth and in the dried specimen

the ground-colour is deep ochreous with the markings in brown. In life they are described by the Rev. Canon K. St. Aubyn Rogers as fairly bright green, the variable dark markings having paler centres. A single pupa was purplish brown. There are three examples, all attached to *Loranthus* leaves. Two were taken by Canon Rogers and bear the label "Kongwa, Tanganyika Territory, 1917," and one by Lamborn labelled "Tanga, 1917." Length 15 mm.

Argiolaus maesa Hew. Plate XIII, fig. 17.

This pupa bears a remarkable resemblance to a gall, and is attached to a leaf by a sucker-like expansion of the terminal segment. The remaining abdominal segments are rounded and swollen and bear two very conspicuous black depressions in the dorsal line, suggesting the openings from which the gall insects have emerged. Judging from the faded colour of the pupa case the posterior part is green, matching the support. The cuticle is devoid of hairs, but is finely punctulated and bears a few slight projections. The gall-like appearance in life must be extraordinarily close, for Lamborn described in a letter from Moor Plantation, September 30, 1913, how he had shown, first a Liptenine pupa and then one of *A. measa* on its leaf, to Farquharson, who made out the first but examined the second "in a casual way, remarking, 'A beautiful gall! Something has evidently come out of it.'" The two dorsal marks had also previously suggested to Lamborn that some insect had emerged. The pupa of *maesa* was then taken to another scientific friend who said, "'A gall, isn't it?' his manner suggesting that he rather wondered at being shown such an ordinary thing." Length 13 mm. From the example figured an ichneumon emerged 26.12.13. Lamborn, Moor Plantation.

Epamera laon Hew. Plate XIII, fig. 15.

Pupa. The abdominal segments are much rounded, resembling the previous species. The thoracic portion is ridged and angulated and the whole cuticle is punctulated and bears numerous ridges and prominences. It is especially to be noted that the pupa in its natural position is placed with its long axis nearly at right angles to the stem to which it is attached, as in the case of *Epamera farquharsoni*. Farquharson describes the larva of this species

as dark mole-colour with one or two tiny white and brown spots posteriorly. It is very cryptic and, except in colour, resembles that of *Epamera farquharsoni*. The example figured produced a male which emerged 2.3.12. Length 11 mm. Lamborn, Oni.

Epamera farquharsoni Beth.-Bak. Plate XIII, figs. 6, 10, 12.

Larva (fig. 6). This larva is described as "wonderfully cryptic" and is of a green colour with tiny points of brown or red. I have drawn it from the dorsal aspect, as that point of view seems best to illustrate the very remarkable "mantle edge" or fringe of processes, which evidently enable the insect to blend so perfectly with the surface on which it is resting as to make it practically indistinguishable. These processes are extensions of the thick fibrous cuticle and their irregular outline adds greatly to their efficacy. The dorsal part of the larva is not ridged, but rounded, its regularity broken by small raised processes as shown in the figure. Farquharson records how, having found one of these larvae, he immediately afterwards cut another in two before realising its presence (p. 368). The cuticle (fig. 12) differs considerably from that of *timon* and *paneperata*. It does not show the squamoid surface, and the chitinanths, though somewhat resembling those of *paneperata*, are nevertheless quite distinct. Length of larva 18 mm. Farquharson. Moor Plantation, Jan. 1918.

Pupa. Fig. 10 shows one of the pupa-cases in its natural position just above a flower cushion of the *Loranthus*. It is placed with its long axis at right angles to that of the stem, and in nature is probably far less conspicuous than it appears in the drawing. The pupa is very short, the abdominal segments well rounded, and projecting high above those of the thorax. The whole surface is rough and irregular with occasional smoothly rounded tubercles. On the 1st abdominal segment is a slight concavity very darkly coloured and having the appearance of a hole. The mark is nearly round, but appears slightly elongated in the drawing owing to the foreshortening. There is a smaller more rudimentary mark on the next segment. These marks produce an effect which is much more highly elaborated in the "gall" pupa already described. Length 12 mm. Farquharson, Moor Plantation. Jan. 1918.

Hypokopelates nigra Beth.-Bak. Plate XIII, fig. 19.

Pupa. The pupa is attached along its ventral surface to the underside of a leaf and resembles somewhat that of *Pilodeudorix diyllus* (fig. 8), and is darkly marbled on a slightly paler ground-colour. The cuticle is smooth, but bears numerous very minute hairs. A portion of the larval skin remains attached to the leaf, and from this I have made a preparation which shows the larval cuticle to be covered with chitinanths of the forms shown at fig. 19. Length of pupa 10 mm. From the example figured the male type emerged 16.5.12. Lamborn, Oni.

Lachnocnema bibulus F. Plate XIII, fig. 21.

Pupa. The cuticle of the abdominal segments is thrown into a multiplicity of folds, giving it a very rough appearance, and the peculiar structure of the terminal segments is shown in the figure. At the head are two processes, and the thoracic portion is wavy and irregular. The example shown produced a male, which emerged 1.12.13. Length of pupa 10 mm. Lamborn, Moor Plantation.

Lycaenesthes liodes Hew. Plate XIII, fig. 20.

This small pupa calls for little remark. Its general appearance is shown by the figure, and the cuticle is smooth and bears a sparse but regular covering of very minute hairs. The example shown produced a male which emerged 10.12.13. Length 10 mm. Lamborn, Moor Plantation.

Zeltus sp. ? **lebona** Hew. Plate XIII, fig. 16.

A small perfectly smooth pupa, pale in colour with slightly darker markings. Length 6 mm. Emerged 27.1.12. Lamborn, Oni.

Megalopalpus zymna Hew. Plate XIII, fig. 13.

This curious pupa is remarkable for its elongated form and absence of irregular projections. It is ornamented all over with dark markings which give it a delicately marbled appearance, and on the abdominal segments are smooth rounded processes. It is attached by the terminal segment, its long axis making a slight angle with that of the twig. Length 7·5 mm. Emerged 25.2.12. Lamborn, Oni.

Pilodeudorix diyllus Hew. Plate XIII, figs. 8, 14.

Larva (fig. 14). The colour of the preserved example is fairly uniform and rather dark. The 1st segment is rounded and covers the head, the remainder, to the 9th, present lateral blunt processes and a double row of dorsal projections. The last three segments are of somewhat peculiar shape, as shown in the drawing. The whole surface is covered with fine short spines. Length 14 mm.

Pupa (fig. 8). Attached so that the ventral surface is in contact with the support. The cuticle is smooth and, except for the wing-cases, has a sparse coating of very minute hairs. The dried example is dark brown marbled all over with black. The general shape is shown by the figure. Length 11 mm. The example figured produced a male 13.3.17. Farquharson, Moor Plantation.

c. Note on the Presence of Guenée's Gland.

With regard to the presence or absence of a honey-gland in the larvae of this series which I have examined, there is in that of *Argiolaus paneperata* a slightly paler mark on the 7th abdominal segment, and the distinct appearance of a slit. Lamborn (Trans. Ent. Soc. 1913, p. 475) records the presence of a dorsal gland in the larva of *Argiolaus iulus*. I have not found a similar structure in the larva of *Tanuetheira timon* or in that of *Epamera farquharsoni*, though it might well be hidden by the chitinanths which abound on the cuticle of these species. In the case of *Teratoneura isabellae* and *Epitola honorius* there are so many lines and markings on the cuticle that the presence of the slit would probably be effectively disguised. It would seem very probable that the long and numerous hairs on these larvae are hardly consistent with the presence of active honey-glands. In *Pilodeudorix diyllus* I have not found any outward sign of the presence of the gland. (See, however, pp. 382–83, almost certainly referring to these, by far the commonest *Pterocarpus* Lycaenid larvae).

d. On the "Electric" Sensation caused by Lycaenid Larvae.

One of the most interesting of the late Mr. Farquharson's observations is the suggestion that some of his "Loranthus" larvae, and especially that of *Tanuetheira timon*, are capable

of giving a mild electric discharge (see p. 376). It is most unfortunate that further and more precise experiments were not made with these larvae, such as contact with an electroscope or voltmeter. A shock such as could be felt by the human hand would necessarily be of considerable electrical pressure, and for so great a discharge from creatures so small as the larvae in question, some elaborate development of electroplaxes would be expected. I have made numerous sections of the larvae, and at first, not being familiar with the immensely thick fibrous cuticle possessed by them, I was inclined to suppose that, in spite of its lack of resemblance to known forms of electric tissue, this unusual structure might be the source of the phenomenon. Comparison with some of our native species showed, however, that this special cuticle was not peculiar to the supposed electric larva. Our own Lycaenid larvae such as *betulae* and *quercus* are similarly endowed, though they do not appear to afford any electric manifestations. The cuticle of the larva of *timon* is extremely rough and would therefore cause considerable friction between itself and the human skin. In view of this it appeared to me that if the larva were capable of producing, when handled, extremely rapid muscular contractions or vibrations, an effect such as that described might well be produced on the delicate tactile nerve-endings of the human skin. After theorising in this way, I had the opportunity last spring of examining some larvae of *T. pruni*, which in general appearance are not unlike those of *timon*. I was examining one of them under the stereoscopic microscope when I was interested to note that it did in fact "shiver" at short intervals. The movement was not sufficiently rapid to produce an electrical sensation, but it at least demonstrated that such muscular vibrations are possible. I do not wish to convey the impression that the electrical theory is necessarily erroneous, but in the absence of tissue having any resemblance to known forms of electroplax, other possibilities should have due consideration. The yellowish points which Farquharson regarded as the centres of the discharge are almost certainly the chitinanths already described.

e. On the Prolegs of Lycaenidae.

On the figure of the larva of *Tanuetheira timon*, Pl. XIII, fig. 7, small processes may be observed on the prolegs.

Similar structures are found * on the prolegs of *Teratoneura isabellae*, and one of these is illustrated on a larger scale on Pl. XII, fig. 14. They consist of small diverticula of the cuticle, extensible by internal fluid pressure. We have discussed these structures with Dr. T. A. Chapman, F.R.S., who has given us much valuable information on the subject. In most Microlepidoptera there is on the prolegs a complete circle of hooks, whilst in most Macrolepidoptera half the circle has become atrophied. Dr. Chapman states that he formerly expressed the opinion that it was the outer half of the circle which had been preserved and the inner half lost. He now considers that the reverse is the case and

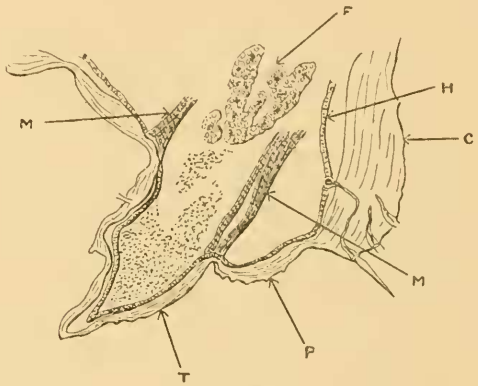


Fig. 4.

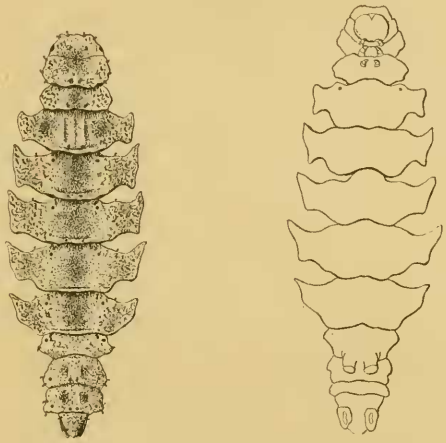
that in those species in which but half the circle of hooks remains, it is the inner half which persists. Now within this circle of hooks there is a kind of pad which can be protruded or withdrawn. This action gives to the hooks a rocking motion by which they engage and disengage with the surface on which the larva is progressing. There can be but little doubt that the papillae observed in many Lycaenid larvae are really developments of the centre of the extensible pad, and that they assist the larva by adhesive or tactile functions, or perhaps both. On this point see Farquharson's account on pp. 352, etc. That this is almost certainly the correct interpretation of the development of the papilla is shown by text fig. 4, which is a section

* Some of the detail of the original drawings has been lost in reproduction. Most of the figures will, however, bear examination with a low-power hand lens.

of the structure as found in *Callophrys rubi*. T is the papilla, P the position of the surviving hooks of the proleg, M is the muscular tissue, F the fat body, H the hypoderm, and C the cuticle. It will be seen that the papilla is not a separate organ, but is, as already indicated, a diverticulum of the cuticle. Incidentally the section supports the view that it is the inner half of the hooks which persists.

f. Note on a Remarkable Geometrid Larva.

Amongst the specimens sent home by Mr. Farquharson is a Geometrid larva which he describes as having the appearance of a small centipede. Unfortunately it was



A B

Fig. 5.

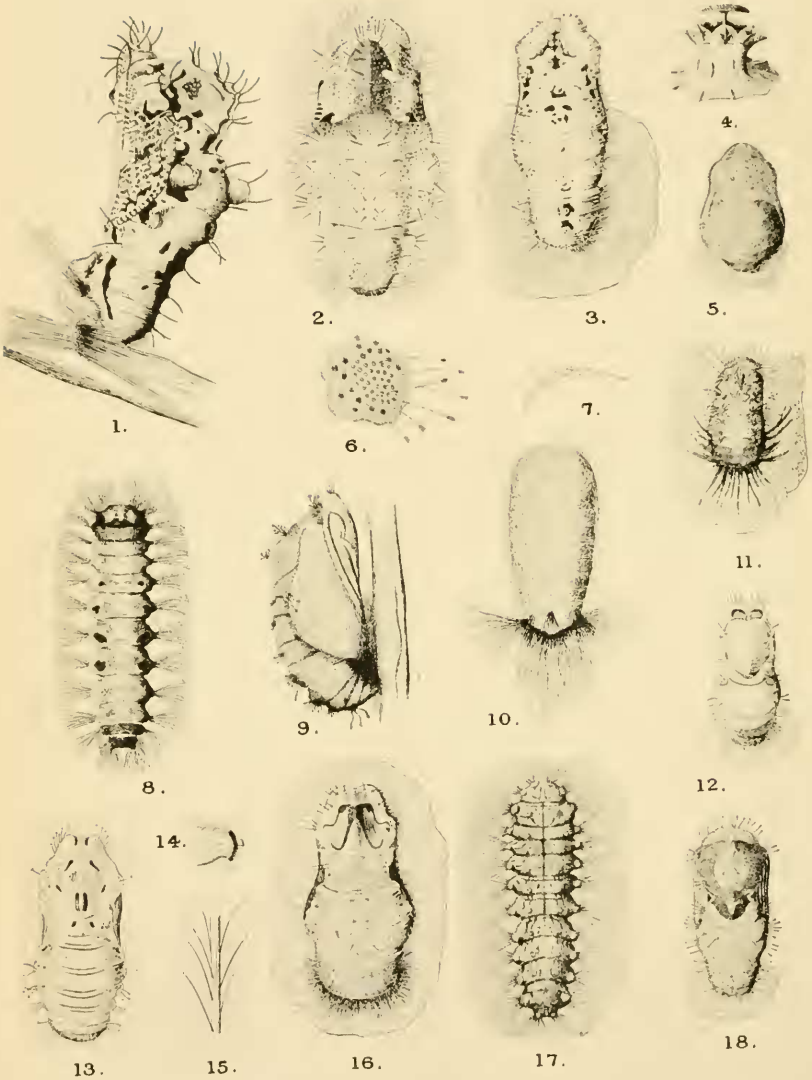
not on its food-plant and was the only example found by him, so that there is no means of identifying the species. The example I have figured is about 15 mm. in length. It was evidently undergoing a moult as parts of the old cuticle became detached on touching it. Text fig. 5, A shows a dorsal view. The first two segments are expanded and flattened, fused together, and dorsally slightly concave. They completely hide the head, at the same time forming a false head, the effect being much enhanced by the first pair of spiracles, which are black and so placed as to resemble eyes. The 3rd segment is more or less normal, but the 4th to 8th inclusive have large lateral expansions. The

spiracles of the 1st abdominal segment are completely displaced and appear on the underside. The 6th, 7th, and 8th abdominal segments are reduced in width, and the 9th and 10th more or less fused together. The whole cuticle is very rough and covered with minute wart-like protuberances in masses of ochreous and dark brown which produce a marbled effect. One of the many surprising features of the larva is the presence at many points of chitinanths, resembling those hitherto only found in Lycaenid larvae. At text fig. 5, B is a diagrammatic drawing of the underside to show the position of the true head, the first pair of spiracles, and the usual Geometrid prolegs. Farquharson refers to the larva as a "looper," so that we may assume that when alive it adopted that familiar method of progression. Mr. Prout has kindly examined the drawings of the larva and thinks it is certainly a Geometrid "perhaps an Emerald." I am indebted to Sir Geo. Hampson for reference to another Geometrid larva with which it may be compared. It is that of *Uliocnemis cassidara* Guén. (= *Comibaena biplagiata*) and is illustrated in Hampson, Ill. Het. IX (p. 145), Pl. 176, fig. 18, from a drawing by Mr. E. E. Green. It is described as yellowish drab, sides of the somites produced into fleshy processes on which the larva fastens small pieces of withered leaves and stick, as a disguise. It rests with the thoracic somites doubled under the body. Ceylon.

In this case the processes are not flattened but are in the form of tubercles. The appearance of the resting larva in its curious attitude and with its decoration of particles of dead leaf is very peculiar and evidently highly protective. Farquharson's larva was found at Agege, Oct. 18th, 1917.

g. On the Cocoon of Chionema farquharsoni B.-B.

The single example of this new species of Lithosid moth emerged from a pupa enclosed in a remarkable cocoon. The latter consists of an extremely thin silken bag covered all over with what are evidently the larval hairs. Each of these consists of a central stalk covered with innumerable fine branches, and each hair is attached to the cocoon by one end, so that all radiate from the centre, the result being a regularly constructed ball of mouse-coloured down. (See also p. 464.) Farquharson, Moor Plantation. 1916–1917.



H. Eltringham del.

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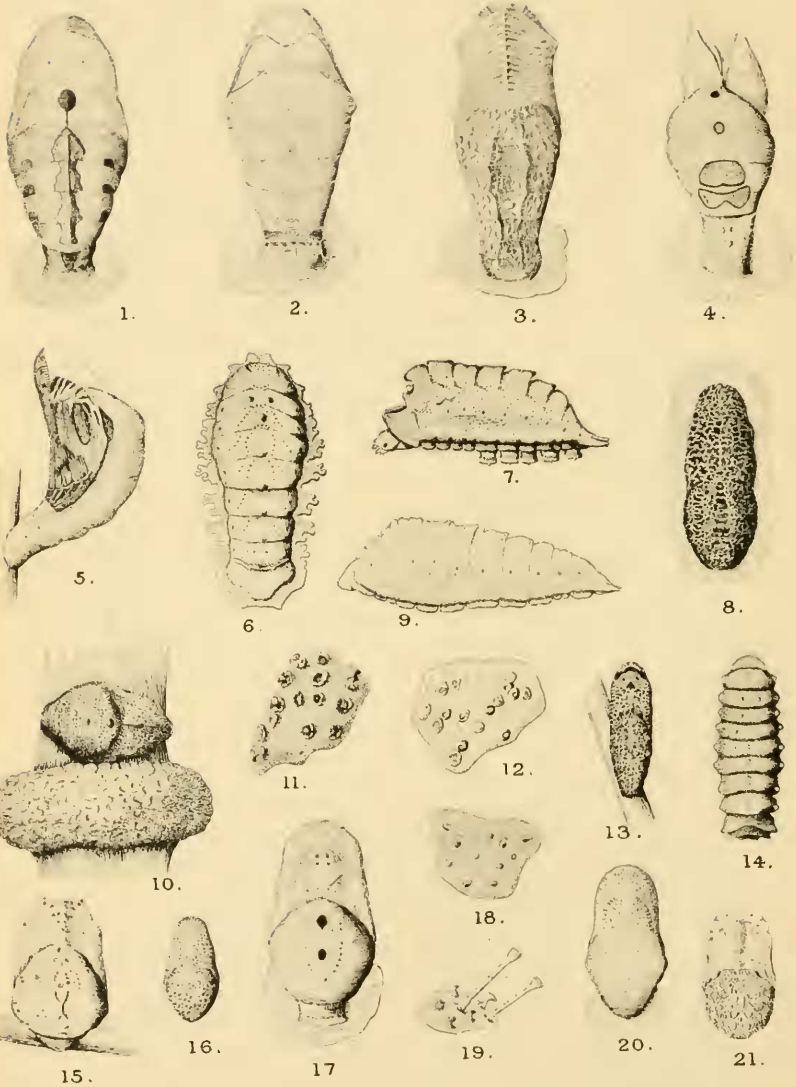
LYCAENID LARVAE AND PUPAE.



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LYCAENID LARVAE AND PUPAE.

Explanation of Plate XII.

Lipteninae.

Fig. 1. *Epitola hewitsoni*, pupa.
2. *Hewitsonia similis*, pupa.
3. *Epitola ceraunia*, pupa.
4. *Aslauga lamborni*, a chitinanth.
5. ,, ,, pupa.
6. *Iridopsis incredibilis*, part of pupal skin.
7. *Teratoneura isabellae*, one of the urticating spicules.
8. ,, ,, larva.
9. ,, ,, pupa.
10. *Iridopsis incredibilis*, pupa.
11. *Citrinophila tenera*, pupa.
12. *Epitola* sp., pupa.
13. ,, *concepcion*, pupa.
14. *Teratoneura isabellae*, proleg with papilla.
15. ,, ,, part of one of the long hairs of larva.
16. *Epitola honorius*, pupa.
17. ,, ,, larva.
18. ,, *carcina*, pupa.

Explanation of Plate XIII.

Lycaeninae (except Fig. 3).

Fig. 1. *Argiolaus* sp. near *silarus*, pupa.
2. ,, *alcibiades*, pupa.
3. *Euliphyra mirifica*, pupa.
4. *Argiolaus iulus*, pupa.
5. *Tanuetheira timon*, pupa.
6. *Epamera farquharsoni*, larva.
7. *Tanuetheira timon*, larva.
8. *Pilodeudorix diyllus*, pupa.
9. *Argiolaus paneperata*, larva.
10. *Epamera farquharsoni*, pupa.
11. *Tanuetheira timon*, part of larval skin with chitinanths.
12. *Epamera farquharsoni*, part of larval skin with chitinanths.
13. *Megalopalpus zymna*, pupa.
14. *Pilodeudorix diyllus*, larva.
15. *Epamera laon*, pupa.
16. *Zeltus*? *lebona*, pupa.
17. *Argiolaus maesa*, pupa.
18. ,, *paneperata*, part of larval skin with chitinanths.
19. *Hypokopelates nigra*, larval chitinanths.
20. *Lycaenesthes liodes*, pupa.
21. *Lachnocnema bibulus*, pupa.

IX. *The mature Larva and Pupa of Catochrysops phasma Butl.* (*Lycaeninae*). By Dr. T. A. Chapman, M.D., F.R.S.

The larva preserved in spirit of *C. phasma* has the colourless aspect of a hidden feeder (like *Lycaena arion* L., which is pale flesh-colour). Length—14 mm.; width mesothorax —4·5; 4th abdominal segment—5·0; 7th abdominal—4·5. Has the appearance of being distended, with segments approximately circular in transverse section. Ventral surface straight from 2nd thoracic to posterior end; prothorax a little projecting ventrally and head (on a neck) projecting ventrally 1·3 mm. Dorsum is curved, from front of prothorax, which is a little below the ventral line (of median segments), rising quickly over prothorax, then in a regular sweep, highest, of course, over 4th abdominal segment, with quite a hump over honey-gland and then sloping to end of 10th abdominal, which projects 0·6 mm. behind claspers which are placed nearly 1 mm. from the margin of segment towards the mid-ventral line.

The hinder portion of left side is darkened by some disease or *post mortem* change; the rest is of a very pale flesh tint, which may, of course, be lighter or darker than that during life. There are small brownish patches a little way above prolegs (not quite a third of the way to spiracles): these brownish areas are roundish and wrinkled, and a little depressed centrally and, though uncoloured, exist on segments forward to mesothorax.

The spiracles have a somewhat dorsal position and are brownish. There is a fringe of short hairs on anterior margin of prothorax and at extremity of last segment. The general surface looks glabrous, but there exist single hairs below the spiracles and possibly elsewhere (on primary tubercles?), and the general surface shows the skin-points as minute hairs. The prolegs have each two pads (almost united), carrying black crochets, 8 on the anterior and 7 on the posterior, in two rows, alternating but all of same size; there is also the usual separate central pad. The true legs are small (about 0·5 mm. long) and black, but brown when mounted and seen by transmitted light. They have at their bases a few short hairs, and just above each is a patch of hairs of which two are about 0·6 mm. long, four or five shorter and a few others graduating down to the ordinary skin-point hairs.

The head is black, very small for a larva of this size—0·7 mm. wide. The antero-posterior head measurement is about 0·4 mm. and of the neck 0·8 mm. It may or may not be stretched to its full length, but looks as if it were. *Arion* has a still smaller head—0·6 mm. across, but that species has a very special history as to moults, etc.

The hairs on the front margin of the prothorax are numerous and a good many are as long as those above the legs, viz. 0·6 mm. The prothoracic plate is not defined or tinted in any way; two flights of lenticles, one to either side of the middle line, may indicate its lateral wings. A few hairs about 0·25 mm. long are at the end of last segment, and the bases of the prolegs have some hairs rather longer than the ordinary skin-point hairs. On each abdominal segment from 3rd to 6th there is a longish hair (about 0·3 mm.) at the middle of the segment, a third of the distance from the proleg to the spiracle. This has about it some hairs rather larger than the usual skin-points. Dorsally, in fact above the spiracles, there appear to be no hairs, except the fine skin-points. Each of what appear to be the usual skin-points carries a very fine hair, about 0·04 to 0·06 mm. long. Small lenticles are numerous. These are only about 0·03 mm. in diameter; some have the usual dotted closing membrane, others have a central portion in the membrane somewhat denser, as though it represented an abortive hair. Most of the lenticles look as if the sides were conical frustra, nearly half their width in height. Below the spiracles they are less numerous—about 6 on the forward segments, increasing to 12 or 16 on the posterior.

Above the spiracles, the segments are divided into an anterior and posterior subsegment by a narrow band defined by the skin-point hairs being wanting for some way above the spiracles, and, across the dorsum, by a want of lenticles. On the anterior subsegment are about 80 lenticles irregularly disposed but most numerous above the spiracles, sparse dorsally. The posterior subsegment is divided into an anterior portion carrying a band of lenticles and a posterior without them; these number about 120; they are least numerous near the spiracles, but abundant on each side of the dorsal line, along which, however, they are absent. The spiracles, 0·12 mm. across, are brown (in the preparation), and are raised, by their

chitinous sides being conical, to a height nearly equal to their width.

The existence of a honey-gland is highly probable, since a local disease or injury that obscures the region and prevents a definite statement being made, is a frequent result of captivity in larvae whose honey-glands are deprived of the proper stimuli to exercising their normal activities. In this larva the gland seems to have been the centre of some disorder, causing the brown coloration of the larva, and, just outside it, is what looks like a premortem wound. The brown chitinous-looking wrinkles about it are probably merely pathological. Ordinary lenticles are not in excess about it, but there are close to it many very small, nearly colourless lenticles, about half the width of the others. There is no fan on 8th abdominal segment, but at its probable position is a chitinous arc, lost in the diseased condition on one side, but looking like a normal structure on the other.

The interior structures present various larval organs, especially tracheae and fat-masses, but no trace of anything that could be supposed to be a part of an ant larva or pupa. Indeed, the intestinal canal was barely recognisable and empty. The mandibles have eight teeth all sharp and pointed, and the middle ones rather long; they suggest, though not perhaps very decisively, a carnivorous employment. *Arion* has similar sharp teeth, but they are also found in purely vegetarian larvae, such as *icarus*. There were no traces of imaginal organs.

The pupa of *C. phasma* is of a nearly uniform dark terra cotta colour and of the usual Lycaenid form, 13·0 mm. long by 5 mm. broad. It is for the most part remarkably free from hairs and lenticles of any sort, but round each spiracle (abdominal) are a dozen or two minute hairs, colourless and glassy, about 0·06 to 0·08 mm. long; each has a solid shaft for about half its length, the remainder divided into several, usually a good many, radiating spicules sometimes arising together, sometimes a little spread over the end of the shafts; some smaller similar hairs are seen on the prothorax.

The 8th abdominal segment narrows ventrally almost to disappearance, the 9th gives a small triangular mid-ventral projection, and the 10th a rather larger rounded projection, about 1·3 mm. across and 0·7 mm. long. Dorsally the 9th and 10th are not separately distinguishable;

the rather large piece overhangs the venter and its point is the most projecting portion of the ventral line; it is about 1·6 mm. long by 2·0 broad. It terminates in a low ridge and a few points darkly chitinised, almost black, with half a dozen anchor-ended cremastral hairs.

The appendages of the male butterfly did not suggest alliance with any groups I know, certainly not with *Lycaena* (*arion* L.), and almost equally not with *strabo* (type of *Catochrysops*). I am not familiar with the group to which it belongs, but various butterflies that have the same type of markings seem to have appendages very different from each other.

X. *Description of a new Genus and Species of Tineina (Lep.) from Southern Nigeria.* By J. Hartley Durrant.

HYPONOMEUTIDAE.

Mnemoses, gen. n. (Drnt.).

(*μνῆμα* = a memorial; *σής* = a moth).

Type: *Mnemoses farquharsoni* Drnt.

Antennae 2/3, uniserrate, the serrations ciliate; basal joint elongate, somewhat enlarged, with pecten of long hair-scales. *Labial Palpi* moderate, subascending, loosely scaled, terminal joint shorter than median. *Maxillary Palpi* short. *Haustellum* moderate, scaled. *Ocelli* obsolete. *Head* loosely hair-scaled. *Thorax* smooth. *Forewings* elongate-ovate; *neuration* 12 veins; 1 furcate at base; 3 from angle, 3–5 approximate, 4 slightly nearer to 3 than to 5; 7–8 closely approximate at base, 7 to below apex; 9–10 stalked; 11 from areole, at slightly beyond half its length; a subcostal stigma above 12. *Hindwings* almost 1, subovate, evenly rounded from apex; *neuration* 8 veins; 3–4 connate, or from short stem; 4–7 nearly parallel, 5 nearer to 6 than to 4; discoidal obliquely receding from 3 to 7; 12 not connected to radius; 1ᵇᶜ furcate at base. *Abdomen* rather long, somewhat flattened. *Legs:* hind tibiae with long hair-scales.

Apparently most closely allied to *Eremothyris* Wlsm. and *Anticrates* Meyr., but differing from both in FW. 11 arising from the areole, and in the clothed hind tibiae.

Mnemoses farquharsoni, sp. n. (Drnt.).

Antennae yellowish, basal joint white. *Palpi*, *Head* and *Thorax* shining white. *Forewings* chalk-white, with pale leaden grey markings: a large cordate grey patch occupies the apical third and is connected narrowly along the termen to a tornal patch expanding above the dorsum to almost half its length; above this, narrowly separated from the apical patch, is an ovate patch of the same colour, and along the costa, above and towards the base is a grey irroration, below which, on the fold, in the basal third, is a subovate grey patch; cilia shining white; underside pale leaden grey, the margins and cilia white. *Exp. al.* ♂ 18–21 mm. ♀. *Hindwings* pale leaden grey; cilia shining white. *Abdomen* shining white. *Legs* shining whitish; hind tarsi leaden grey.

Type ♂ (350484); ♀ (350485); *slide* ♀ (350487) B.M. [*PTT.* 7772–3, 7775–9, 7781, 7783, 7785–7 (Drnt. Det. 1920). Hope Dept., Mus. Oxf.].

Hab. AFRICA, W.: LAGOS: Agege, ⊕ ivory whitish, head yellowish; under mantle of gnawed bark and frass on trunks of *Hevea brasiliensis* Müll. Arg., ex. 23. IX—11. X. 1917; Jan. 17, 1918. (*C. O. Farquharson*). Fifteen specimens.

By request of Prof. Poulton this species is named after the late Mr. C. O. Farquharson.

D. DIPTERA.

XI. *A Revision of the Genus Harpagomyia de Meij.* (*Diptera, Culicidae*). By F. W. Edwards.

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Plate XVI, figs. 5–12, facing p. 517. Text Figure 6.

The genus *Harpagomyia* was founded by de Meijere in 1909 for a Culicid fly found in Java by Jacobson, with very remarkable habits, and with a most pronounced adaptation of its mouth-parts, the mandibles and maxillae in both sexes being absent. In the previous year the same fly had been described by Leicester under the name *Malaya*, but this name has been considered by the present writer (1912) to be preoccupied by the Coleopterous genus *Malaia* Heller, and that being so, de Meijere's name can be used for the genus. This is fortunate, for de Meijere's work was much more detailed than Leicester's, the latter author merely describing the external characters of a single male specimen caught in a bungalow. Shortly after de Meijere's paper appeared, the genus was again described by Theobald (1909) under the name *Grahamia*, but this was corrected to *Harpagomyia* in the last volume of his monograph (1910).

The genus may be characterised as follows :—

Eyes contiguous or narrowly separated. Head clothed only with broad flat scales with rounded ends. A pair of strong vertical bristles present, separated by a wide space from the orbital bristles. Clypeus rather long and narrow, somewhat tapering. Palpi alike in the two sexes, scarcely longer than the clypeus and in close contact with the base of the proboscis; jointing indistinct. Antennae alike in the two sexes; flagellar joints all about equal in length and with moderately long basal hair-whorls. Proboscis rather short, hairy, directed backwards beneath the body when at rest; labella very large, thicker than the proboscis and nearly one-third as long, carrying two pairs of very long curled hairs. Mandibles and maxillae absent. Prothoracic lobes separated, completely clothed with flat metallic scales, with bristles on front margin only. Mesonotal bristles developed on the sides only. Pro-epimeral and spiracular bristles both present, but few in number (1–3). No sternopleural or lower mesepimeral bristles. Postnotum bare. Male hypopygium: side pieces from 2 to 3 times as long as broad, bearing scales on the dorsal surface, no apical lobes, basal lobes scarcely differentiated, bearing a tuft of

spines, beyond which on the inner aspect of the side-piece are two additional spines; clasper simple, curved, with a short, thick, terminal spine. Tenth sternites simple, pointed, bare, with basal enlargement. Parameres small and inconspicuous. Mesosome well chitinised, divided or entire, according to the species. Female abdomen blunt-ended, eighth tergite somewhat bristly. Hind tibiae shorter than the others. Claws all simple, in the male the front pair slightly unequal. No pulvilli. Wings with the fork-cells longer than their stems, the upper somewhat narrowed towards the apex. Tip of sixth vein nearly level with the base of the fork of the fifth, and only slightly beyond the base of the second. Wing-scales pointed. Microtrichia present on membrane of wings.

Larva: Antennae short, without hair-tuft. Head tufts normal in number and position. Metathorax without strong spines. Comb of 8th segment an irregular patch of scales. Air-tube with numerous hair-tufts, on both dorsal and ventral surfaces, and with round-ended, flat, fringed scales similar to those of the 8th segment, arranged in two irregular rows on each side, apparently representing the pecten. No ventral brush on last segment.

The adults are very small dark-coloured mosquitoes with metallic markings; they live in association with ants of the genus *Cremastogaster*, which they solicit for food, obtaining it by inserting the proboscis between the ants' jaws. The larvae live in old water-filled nests of the ants (Jacobson), or in water collected at the bases of wild pineapple leaves (James, Stanton). The remarkable habits of the adults have been described in some detail by Jacobson, Banks,* James and Farquharson.

In spite of the absence of bristles on the postnotum, there can be no doubt that the genus should find a place among the Sabethini, on account of the larval characters, and the head bristles, round-ended scales and short hind tibiae of the adults.

Up to the present the following specific names have been proposed:—

Malaya genurostris Leicester (1908). Kuala Lumpur.
Harpagomyia splendens de Meijere (1909). Java.
Grahamia trichorostris Theobald (1909). Ashanti.
Harpagomyia coeruleovittata Ludlow (1911). Philippine Is.
Harpagomyia taeniarostris Theobald (1911). Uganda.

* See Theobald 1909 and Muir 1919. I have been unable to trace Banks' work.

As I have previously stated (1913), *splendens* and *coeruleorittata* appear to be synonyms of *genurostris*, almost the only difference observable between specimens from Java and Kuala Lumpur (as also from Ceylon) being in the colour of the thoracic integument, which may perhaps depend on the age of the individual. However, the Philippine species (*H. coeruleorittata*) may be distinct from *H. genurostris*, since Dr. Ludlow describes the clypeus as being "heavily covered with a rather long fine white fuzzy tomentum." This could hardly be said of any of the five species I have examined, in which the clypeus is at most pollinose, distinct "tomentum" not being visible under a magnification of 100.

The two described African species, however, are certainly distinct from one another, and from *H. genurostris*, though the distinction I have given between them (1912) does not hold good, being based on a mixed series. Besides these two, a close study of Mr. Farquharson's material, in comparison with that already existing in the British Museum, has revealed the existence of two more. It is certainly remarkable that there should be apparently only a single species in the geographically discontinuous areas of Ceylon, the Malay Peninsula, Java and the Philippines, while there are four distinct species in Africa; but this is the only conclusion possible from an examination of the available material.

The five species are all very similar; the following diagnoses include all the characters (so far as I could ascertain) which are not common to all of them.

KEY TO THE SPECIES.

Clypeus yellow.
- Eyes separated by a scaled line . . 1. *genurostris* Leic.
- Eyes practically touching . . . . 2. *taeniarostris* Theo.

Clypeus black.
- Head scales all blackish. . . . . 3. *fraseri*, sp. n.
- Head scales silvery in front.
  - Mesonotum with median silvery line. 4. *trichorostris* Theo.
  - Mesonotum without such line . . 5. *farquharsoni*, sp. n.

1. **H. genurostris** Leicester. See Plate XVI, fig. 5 × 50.

Clypeus yellow, with a silvery-grey pollinosity. Proboscis (except labella) more or less yellow. Eyes narrowly separated by a silver-scaled line. Head with a patch of bluish-silvery scales in

front. Mesonotum with a double median longitudinal row of metallic silvery scales, integument varying in colour from light brown to black. Pro-epimeral scales silvery. Abdomen with lateral patches of silvery scales on segments 2, 4, 5, 6 and 7, those on segments 2 and 4 the largest. Male hypopygium very small, often almost entirely hidden, yellowish in colour. Basal lobe of side piece with two distinct spines and several stiff hairs; side pieces less than twice as long as broad. Lobes of ninth tergite slightly prominent, with about 8 undifferentiated hairs. Mesosome divided.

The British Museum series includes Leicester's type male; 6 ♀ from Batavia, Java (*F. W. Terry*); 1 ♂ 3 ♀ bred from larvae from wild pineapple, Kuala Lumpur (*Dr. A. T. Stanton*); and 2 ♀ 2 ♂ from Colombo, Ceylon (*Col. S. P. James*).

2. **H. taeniarostris** Theobald. See Plate XVI, fig. 6 × 50.

Differs from *H. genurostris* as follows :—

Eyes practically touching, at any rate no scales on the line separating them. Pro-epimeral scales pale golden. Male hypopygium larger, blackish. Spines on basal lobe of side piece and on lobes of ninth sternite more numerous. Aedoeagus rather differently formed.

Besides Theobald's male type from Kampala Swamp, Uganda, the British Museum collection now contains a female from Dar-es-Salaam, E. Africa (*A. W. J. Pomeroy*). The mesonotum in both specimens is very much rubbed, but the female shows traces of the double median row of metallic scales, and this must therefore be presumed to be present in the male also.

3. **H. fraseri,** sp. n. See Plate XVI, fig. 8 × 50.

Clypeus blackish, with very slight grey dusting, rather shorter than in the two preceding species. Proboscis entirely dark. Eyes separated by a very narrow unscaled line. Head scales all blackish. Pro-epimeral scales silvery. Mesonotum with no trace of a double median row of metallic scales, the whole surface being covered with narrow, straight blackish scales; integument black. Abdomen with silvery lateral spots on segments 2, 4, 5, 6 and 7. Male hypopygium rather larger than in the two preceding. Side pieces over twice as long as broad; basal lobes with four or five spines besides a few hairs. Lobes of ninth tergite elongated, with five bristles, of which the apical two are stronger than the others. Mesosome not divided, not very strongly chitinised.

Described from two males in good condition in the British Museum collection from Mpumu Forest, Uganda, July 1910 (*Capt. A. D. Fraser, R.A.M.C.*). The specimens had previously been identified as *H. taeniarostris* Theobald, but are obviously distinct.

4. **H. trichorostris** Theobald. See Plate XVI, fig. 7 × 50.

Differs from *H. fraseri* as follows:—

Eyes distinctly separated by a scaled area on the upper part of the front, touching below. A large patch of metallic silvery scales on head in front. Mesonotum with double median row of metallic scales. Male hypopygium large, prominent, yellowish. Side pieces three times as long as broad, basal lobes with a tuft of about 10 spines. Lobes of ninth tergite elongate, with two strong spines at the tip and one shorter bristle internal to these. Mesosome undivided, strongly chitinised.

Known only from Theobald's type male and female from Obuasi, Ashanti (*Dr. W. M. Graham*).

5. **H. farquharsoni,** sp. n. See Plate XVI, figs. 9–11 × 50 and fig. 12 × 200.

Differs from *H. fraseri* as follows:—

Eyes distinctly separated by a scaled area on the upper part of the front, touching below. A large patch of metallic silvery scales on head in front. Male genitalia small, resembling those of *H. genurostris* except in the structure of the mesosome. Lateral silvery spots on segments 5 and 6 of female abdomen very small.

Six males and five females from Ibadan, S. Nigeria (*C. O. Farquharson*). None are in perfect condition, but none show the metallic thoracic line: two or three metallic scales are present on the front of the mesonotum in one specimen, but these may have been displaced from the prothoracic lobes.

[The material here described was sent by Mr. Farquharson in two consignments, of which the first—1 ♂, 5 ♀—was intended to illustrate the observations recorded in Proc. Ent. Soc., Lond., 1918, pp. xxix–xxxix, and was exhibited to the Society at the next meeting (pp. xxxix, xl). It was erroneously identified by Mr. Farquharson (p. xxxii) and Dr. Guy Marshall (p. xl) as *H. trichorostris* Theo., and also wrongly sexed (p. xl). The examples were

captured at a "*Cremastogaster*-tree" at Moor Plantation, near Ibadan, on Dec. 14, 1917, and the ♂ was being fed by an ant received in the same consignment—a worker of *Cremastogaster buchneri*, near *alligatrix*, if not actually this race. Of the 5 ♀, 2 are in the Coll. Brit. Mus.

The second consignment consisted of 5 ♂ (2 in Brit. Mus.) from the same locality, Aug. 10, 1918, accompanied by a sample of the ants which were feeding them. This worker ant was also near the race *alligatrix*. Similar workers were being robbed by the Cecidomyid *Farqu-*

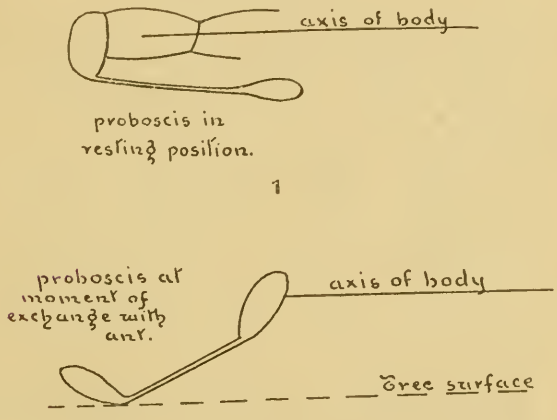

Fig. 6.

harsonia rostrata, on the same date (pp. 410–42). The ants were kindly compared by Mr. W. C. Crawley and Mr. A. H. Hamm with specimens named by Dr. Forel. The 5 ♀ in the first consignment offer sufficient evidence that this sex as well as the other is fed by the ants. Mr. Donisthorpe tells me that Dr. Jacobson does not mention the sexes of those he observed being fed by ants in Java. Dr. Eltringham has kindly traced and made available for reproduction in text fig. 6, a hurried sketch in Farquharson's letter of Dec. 23, 1917, quoted in Proc. Ent. Soc., 1918, pp. xxxiv–xxxv. The record of so accurate an observer, who had just carefully studied the insects in life, is well worth preserving.—E.B.P.]

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Explanation of Plate XVI (Figs. 5–12)

(Facing p. 517.)

Fig. 5. Male hypopygium of *Harpagomyia genurostris* Leic., seen from beneath × 50.

6. Male hypopygium of *Harpagomyia taeniarostris* Theo., seen from beneath × 50.

7. Male hypopygium of *Harpagomyia trichorostris* Theo., seen from beneath × 50.

8. Male hypopygium of *Harpagomyia fraseri*, sp. n., seen from beneath × 50.

9. Side piece of male hypopygium of *H. farquharsoni*, sp. n. × 50.

10. Anal segment and aedoeagus of *H. farquharsoni*, sp. n., from above × 50.

11. Ninth tergite of *H. farquharsoni*, sp. n. × 50.

12. *H. farquharsoni*, sp. n., internal parts further enlarged and flattened out. *a*, Tenth sternites; *b*, basal enlargement of tenth sternites, connecting them with the ninth tergite; *c*, aedoeagus (= unci of Dyar); *d*, small rods lying within the genital tube; *e*, parameres folded back ×200.

XII. *Description of a new Genus and two new Species of Cecidomyidae, and six new Species of Acalyptrate Muscidae (Ephydridae and Milichidae).* By J. E. Collin.

Plates XIV, XV, XVI (figs. 1–4), XVII.

CECIDOMYIDAE.

Subfamily :—*CECIDOMYINAE.*

Group :—*Cecidomyiariae* (*Diplosariae*).

Farquharsonia, gen. n.

Eyes connected for a long distance on upper part of head. Antennae 2 + 12 jointed, the flagellar joints in the male binodose, the two nodes being connected by a narrow neck except on the first flagellar joint, where the neck is indicated by a slight constriction; each node with an apical circlet of looped threads, the loops all about equal in length and barely reaching to the base of the following node, the apical node of each of at least the first ten flagellar joints with, in addition, a basal circlet of inconspicuous pores similar to those on the antennal joints of the female, and like them without looped threads; apical joint with a short cylindrical terminal process. Flagellar joints of female cylindrical and sessile; each with two circlets of inconspicuous pores connected by two longitudinal lines of similar pores. Palpi four-jointed, long and very slender. Proboscis extraordinarily developed, half as long again as head is deep, chiefly composed of the greatly developed paraglossae. Male hypopygium with a conspicuous triangular projection at base of the basal segment of the forceps; apical segment slender and bare with a slightly hooked tip; upper anal lamella triangularly emarginate; lower lamella longer, somewhat battledore-shaped, bearing numerous hairs round the margin, and considerably shorter than the style. Female ovipositor not extensile, terminating in two oval upper, and two very similar lower, lobes. Legs clothed with short adpressed scale-like hairs. All ungues bifid, the lower tooth shorter and more slender than the upper; empodium rudimentary. Wings rather short and broad, auxiliary vein present (more easily distinguished where viewed from beneath), cubital vein slightly down-curved and ending very little below tip of wing.

This genus is easily distinguished by the structure of the mouth-parts. If the presence of an auxiliary vein has not been overlooked in other genera of the *Cecidomyiariae*, it belongs to a group containing only a few genera, of which *Tetradiplosis* Kieff. from Argentina (known in the female sex only) also has bifid ungues, rudimentary empodium and non-extensile ovipositor.

F. rostrata, sp. n. Plates XIV, figs. 1–10; XVI, fig. 1.

♂. Eyes large occupying greater part of head. Frons and face short, brownish, the latter with a few short yellowish hairs on the lower part. Occiput rather puffed out, brownish-black with a fringe of very long curved black hairs, similar hairs being present on the lower part of head beneath the neck. A small ocellar tubercle bearing a pair of very long curved bristles. Antennae about half as long again as head and thorax together. First flagellar joint only constricted about the middle, second joint with a very short neck separating the two nodes, subsequent joints with this neck and the terminal pedicel gradually becoming slightly longer, but even on the penultimate joint they are hardly as long as the node from which they respectively arise; last node with a cylindrical pubescent terminal process devoid of bristles or pores and only a little more than one-third the length of the node; the basal node of each joint appears to bear only a single whorl of bristles, but the apical node in addition to a subapical whorl, bears numerous finer more strongly curved bristly hairs. Mouth-parts remarkably developed, the two valves of the paraglossae being produced into a huge yellow beak; each valve is thin, chitinous, semi-transparent and clothed on the convex, outer (lateral) side with yellowish hairs which become longer on the hinder edge towards the pointed tip. Inside the chamber formed by these two valves are found the much shorter labrum and hypopharynx, the latter with a long slender "tongue"-like organ reaching to the tip of the paraglossae. This "tongue" is hair-like and microscopically pubescent at the tip. Palpi yellow, four-jointed, very long and equally slender, second joint the shortest, the almost equally long first and fourth joints being slightly longer than the third. Head connected to thorax by a long slender membranous neck.

Thorax yellowish, slightly brownish on disc, with two rows of black bristly hairs (some of them very long) gradually converging to form a large V, starting behind each humerus and ending in front of scutellum; other bristly hairs are present above notopleural depression, on postalar calli, and in the form of two rather ill-defined

tufts at tip of scutellum. A fringe of similar very long bristly hairs extends from below root of wing to base of middle coxa.

Abdomen rather darker than thorax, clothed dorsally and ventrally and on basal segment of genital forceps with numerous long dark bristly hairs, especially long on hind-margins of segments. Legs yellow, but more or less obscured, especially on tibiae and tarsi, by a clothing of short adpressed scale-like hairs. Coxae, trochanters, and all the femora beneath, with rather long dark hairs. Tarsi very long and slender; ungues very small, bidentate, the lower tooth arising near the base, more slender and shorter than upper tooth; empodium absent or very short.

Wings short and broad, the costal, subcostal, and cubital veins dark, the postical and postical folds much less distinct. Auxiliary vein present but inconspicuous, most easily seen when viewed from underside of wing, this vein bears about three small pores just in front of humeral cross-vein; subcostal vein with two similar pores at its junction with costa; cubital vein with a single pore at cross-vein and two others at about three-quarters of the distance to tip. The curved scale-like hairs on both upper and lower surface of wing point towards the base of wing. Halteres with dusky knobs clothed with narrow adpressed scales.

♀. Resembling the male, but antennae shorter, with the joints all simple, longer than broad, almost sessile, and without the looped hairs of the male; the bristles on these joints do not appear to be arranged in distinct whorls, though there appear to be some stronger bristles at the base of each joint, at least on the upperside. Abdomen terminating in a non-telescopic ovipositor, bearing two pairs of ovate, short-haired papillae.

Length (not including antennae), very variable, from ·5 mm. (some males) to 2 mm. (some females).

[A description, on pp. 439–40, of the abundant material is followed by Farquharson's account of the habits. The species was captured at Agege (152 ft.), 16 m. N. of Lagos, as well as at Moor Plantation, near Ibadan, S. Nigeria. The Cecidomyids fly over the carton nests of *Cremastogaster* ants, and, approaching ants engaged in feeding others, endeavour, while hovering in the air, to abstract a portion of the regurgitated droplet. The ant was *Crem. buchneri* r. *alligatrix* at Agege, and near r. *alligatrix* at Moor Plantation.—E.B.P.]

CHAETODIPLOSIS Kieffer, Bull. Soc. Metz, xxviii, p. 103 (1913).

C. gymnastica, sp. n. Plates XV, figs. 1–8; XVI, figs. 2–4.

♂. Eyes connected for a long distance on upper part of head. Antennae 2 + 12 jointed, exceedingly elongate (quite twice as long as the insect itself) and with all the flagellar joints binodose, the nodes connected by a long narrow neck and the joints by a slightly longer pedicel arising from the distal node. Basal node of each joint globular, distal node more elongate, rather wider at tip than at base and more or less constricted about the middle (more so towards end of antennae); basal node with a circlet of looped threads of almost equal length, distal node with two such circlets; basal node with a circlet of long bristly hairs, distal node with an apical circlet of similar hairs, and in addition (especially beneath) with numerous finer more curved hairs. Apical antennal joint with a terminal appendage of which the basal half is ovate, the apical half cylindrical. Face short, yellowish, bearing a few yellowish hairs on the lower part. Palpi four-jointed, yellow; basal joint short, second and third equal, and each about twice as long as the first, fourth joint the longest, slightly longer than the third. Proboscis somewhat prominent (in a prepared specimen about half as long as head is deep), paraglossae not at all pointed. Ocellar tubercle with two long curved bristles, and other curved bristles on occiput and lower part of head beneath neck as in *Farquharsonia*, but more yellowish. Thorax and abdomen yellowish, or brownish-yellow, with bristly hairs much as in *Farquharsonia* but not so dark in colour. Hypopygium with only a very slight basal projection on inner side of basal segment of forceps, apical segment slender, bare, tip slightly hooked and apparently bifid. Upper anal lamella deeply triangularly emarginate, dividing it into two narrow pointed lobes; lower lamella closely adpressed to style, being also the same width as that organ but not quite so long and rounded at the tip. Legs long and slender, yellowish, but obscured especially on tibiae and tarsi by a clothing of adpressed, brownish, scale-like hairs. All femora with long yellowish hairs beneath. Ungues simple. Empodium very short. Wings longer than in *Farquharsonia* and all the veins yellowish; auxiliary vein present; cubital vein strongly down-curved toward the tip and ending well below apex of wing. Halteres yellow, the knob slightly obscured by a clothing of adpressed, brownish, scale-like hairs.

♀. Resembling the male, but antennae not half so long; the flagellar joints simple and cylindrical, connected by a short but

distinct pedicel; each joint with two circlets of minute pores connected by longitudinal lines of similar pores very much as in *Farquharsonia* but the pores smaller and consequently less easily distinguished. The antennae are very distinctly hairy; at the base of each of at least the first ten flagellar joints two or three straight bristly hairs on the upperside are distinctly longer and stronger than any others, the majority of the others being finer, paler, more curved, and especially numerous on the underside of each joint; appendix to apical joint with a few hairs on the ovate basal portion. Abdomen with rather shorter yellow bristly hairs and in addition with numerous very short adpressed, scale-like hairs. Ovipositor membranous, normally telescoped within the abdomen, but capable of very considerable extension, terminating above in two narrow, elongate, club-shaped papillae bearing a few short fine hairs, and beneath with two broadly sessile ovate lobes forming the lower lip of the oviduct.

Length very variable—·5 to 1·5 mm.

[Eight ♂ and 34 ♀ hanging from threads in a hollow in the trunk of *Alstonia*, containing part of the carton nest of *Cremastogaster*, Moor Plantation, S. Nigeria, Aug. 11, 1918. For Farquharson's account of the habits see pp. 442–43.—E.B.P.]

The genus *Chaetodiplosis* was described by Kieffer for the reception of *C. tropica*, a new species from Taveta in British East Africa of which he appears to have seen only a single female specimen with damaged palpi. Farquharson's species seems to agree sufficiently in venation, structure of antennae and ovipositor, as well as in having simple ungues and rudimentary empodium, to be congeneric. Certainly Kieffer described the ovipositor as having "un petit lobe ventral," whereas in *gymnastica* there are two lobes of which the greater part of each is embedded in the membrane of the lower lip of oviduct; also he laid stress upon the antennal joints having "deux verticilles de poils dont *l'inferieur a d'un côte des poils gros, raides et presque deux fois aussi longs* que ceux de l'autre côte," while not mentioning the numerous fine curved hairs which exist beneath each flagellar joint in *gymnastica*. These differences however, do not appear to justify the separation of *gymnastica* generically from *tropica*, especially so long as the male of the latter species remains undiscovered.

A single female specimen of a quite distinct species was found among the numerous specimens of *C. gymnastica*

collected by Farquharson as described on p. 442. It is easily distinguished by its straighter cubital vein ending at wing-tip, and the more ovate terminal lobes of ovipositor. In default of further material no attempt has been made to mount and describe this specimen.

EPHYDRIDAE.

RHYNCHOPSILOPA Hendel, Suppl. Ent., II, 96 (1913).

R. apicalis, sp. n.

Frons, thorax and abdomen brightly shining, glassy, with metallic blue and violet reflections. No acrostichal bristles. Tip of wing darkened.

♂ ♀. Face shining yellowish with the projecting (clypeus-like) mouth-edge whitish. Palpi dusky yellow. Arista yellow at least about the base but the hairs dark. Scutellum duller than disc of thorax; upper half of pleurae dusted greyish. Thoracic bristles long, but no acrostichals; one pair of dorso-centrals at middle of thorax very long with 2–3 smaller somewhat incurved pairs in front decreasing in length as they approach front of thorax, and one pair (shorter than middle pair) behind, half-way towards scutellum; a humeral, two notopleural, an up-curved posthumeral, two intra-alar (the hinder one very long), a small supra-alar, and two postalar bristles. Abdomen with long bristly hairs especially on the 3rd–5th segments. Front coxae, all tibiae, and tarsi except last 1–2 joints, yellow; rest of legs varying from yellowish-brown to black. Wings with the tip (including the end of the cubital and discal veins) darkened, and with a darkened patch on all the veins across the base of wing, opposite (and including) the humeral cross-vein. Halteres white with a dusky base to stem.

Length about 2 mm.

[Farquharson's material included 2 ♂ 3 ♀ examples of this species, captured between Dec. 25, 1917 and Jan. 26, 1918, at Moor Plantation, nr. Ibadan, S. Nigeria. They were feeding from the anus of dead *Cremastogaster* ants as described in Proc. Ent. Soc., 1918, pp. xxxv, xxxvi, xl. An observation made by Farquharson at a later date (see pp. 443–44) clearly shows that *R. apicalis* pursues the living ants with the same object.—E.B.P.]

The genus *Rhynchopsilopa* was distinguished from *Psilopa* Fallén by Hendel by reason of its long antennae, with the

first joint porrect, second and third drooping, third 3–4 times as long as wide, and pubescent. Only one fronto-orbital bristle and that pointing forwards. Mouth-edge projecting in front. Palpi projecting slightly beyond mouth-edge and bristly at tip. Proboscis geniculate, the middle part long, the small paraglossae bent backwards.

The type-species, *R. magnicornis* from Formosa, is stated to have a distinct bristle at end of second antennal joint directed forwards, palpi dull black, arista black, only one pair of dorso-central bristles with a row of fine hairs in front, acrostichals present ending in a pair of prescutellar bristles.

Another species, *R. rugosiscutata* Meij. from Java, appears to agree with *magnicornis* in having only one pair of dorso-central bristles, but the frontal triangle is dull black, and the scutellum and greater part of pleurae is "runzelig und dadurch ziemlich matt." It agrees more with *apicalis* in having only a very weak bristle at end of second antennal joint pointing forwards.

Neither *magnicornis* nor *rugosiscutata* have a darkened tip to wing.

MILICHIDAE.

Milichia Meigen, Syst. Beschr., vi, 131 (1830).

The following species all belong to the genus *Milichia* as at present restricted, though they differ considerably from the type species (*speciosa*). The bare mesopleurae appear to keep them out of the genus *Rhynchomilichia*, which they approach in the structure of the proboscis. The species described below as *M. farquharsoni* is the most aberrant in chaetotactic as well as other characters. It is considered advisable to retain them all in the genus *Milichia* until a better knowledge of the group has been attained.

1. **M. argyratoides**, sp. n. Plate XVII, fig. 1.

Dull, dark brown species. Abdomen of male almost entirely silvery. Only two parts of dorso-central and fronto-orbital bristles. Face exceedingly short. Third antennal joint darkened.

♂. Head and thorax dull dark brown. Frons wide, at vertex quite five times as wide as third antennal joint is deep, and widening out slightly towards antennae. Frontal lunule with a pair of

distinct bristles on the upper margin. Only two frontal bristles on each side of upper third of frons, the hinder one pointing backwards, the front one forwards, on rest of frons only a single row of very short incurved hairs each side and very short scattered hairs on disc. Face exceedingly short, the mouth-opening curving upwards almost to the tip of frontal lunule, leaving narrow cheeks each side which join the very narrow jowls below the eyes. A short black vibrissal bristle followed by 2–3 others, becoming shorter and finer as they approach and merge into the black hairs on lower part of back of head. Eyes microscopically pubescent. Antennae short, third joint dark brown, slightly yellowish in some lights, with a long, very distinctly pubescent, arista. Palpi very large, dilated in the shape of an equilateral triangle with rounded corners and slightly rounded sides; they are dark yellowish-brown and clothed with very short, fine, dark pubescence. Proboscis hidden between the palpi. Thorax rather greyish on humeri and right in front; front part of meso- and sterno-pleurae olive brown with a tendency to appear greyish in some lights. Disc covered with very short black hairs which leave three exceedingly narrow lines down the thorax, bare. Two pairs of dorso-central bristles, the front pair much the weaker, placed close to the hind pair and a little nearer the mid line of thorax; a strong central prescutellar pair of bristles, a humeral, a posthumeral, two notopleural, and three supra-alar bristles placed in a straight line parallel with a line joining the two strong bristles on postalar callus; four scutellar bristles with the middle pair cruciate; a tiny prothoracic bristle immediately above the base of front coxa and the usual three sternopleural bristles; mesopleura bare. Abdomen only a little broader than thorax, the long 2nd segment and the 3rd–5th segments entirely silvery-grey dorsally as in *speciosa*. Legs the colour of thorax but posterior knees very narrowly yellowish. Wings hyaline except at base as far as humeral and basal cross-veins; end of subcostal vein distinctly, and small (discal) cross-vein slightly, darkened; this latter cross-vein placed at $\frac{1}{3}$, or very slightly more, from base of discal cell; cross-vein closing discal cell sloping so that lower outer angle of cell is acute. Last portion of discal vein slightly shorter than penultimate portion and almost parallel with cubital vein. Squamae and halteres dark.

♀. Resembling the male except that the abdomen is entirely dull, dark brown and bears more numerous short black hairs. Frons slightly wider at vertex and more parallel-sided.

Length 4 mm. One pair.

[The specimens arrived in a pill-box bearing the date

(? of emergence) Sept. 10, 1915, and the locality Mamu (Gambari), in the Shaganu district about 20 miles S. of Ibadan. They were bred on the road from larvae in an exuding wound in the bark of a *Cremastogaster* ant-tree. Notes on the life-history and habits of the larvae will be found on pp. 444–45.—E.B.P.]

M. argyratoides appears closely to resemble *M. argyrata* Hendel from Formosa, which was described as belonging to the *speciosa*-group and presumably differs in having the face long, as in that species. Hendel's species also has only one pair of dorso-central bristles, while the male abdomen is twice as wide as the thorax, and the third and fourth (cubital and discal) veins slightly converge towards tip of wing.

2. **M. proectes,** sp. n.

Resembling *M. argyratoides*, but thorax rather lighter olive-brown. Abdomen with silvery patches at sides only. Antennae with yellowish third joint.

♂. Head in profile very much like that of *argyratoides* but the palpi are not so prominent and are wider at the base, while the row of bristles from vibrissal angle along the mouth-edge are longer and stronger. Face very short but distance from end point of frontal lunule to mouth-edge a little less than third antennal joint is deep. Frontal lunule with a pair of small bristles. Palpi a paler yellowish brown. In the type the paraglossae of proboscis project beyond the palpi as diverging pointed lobes bearing a few black hairs. Thoracic chaetotaxy as in *argyratoides*. Abdomen the same colour as thorax and rather narrower; viewed in some lights the sides of the first four segments are silvery, spreading very narrowly across the front margin of the third and fourth segments; front margin of fifth segment very narrowly silvery at sides. Viewed directly from behind these silvery patches appear dull black. Venter with at least the broad third and fourth tergites silvery in some lights. Legs with the front as well as the posterior knees very narrowly pale, the femora in some lights appearing silvery beneath. Wings faintly tinged with brown, the small (discal) cross-vein rather further from base of cell, last portion of discal vein rather shorter than penultimate portion and almost parallel with cubital; lower outer angle of discal cell rather acute.

Length 3·75 mm.

A single male.

[The specimen formed part of the material, captured at

Moor Plantation, near Ibadan, S. Nigeria, Dec. 23, 1917, to Jan. 26, 1918, and sent to illustrate Farquharson's observations on *Milichia* published in Proc. Ent. Soc., 1918, pp. xxxiii, xxxiv, xl, where it is shown that these flies solicit and receive regurgitated food from ants in the track running up the trunk of "*Cremastogaster*-ant-trees."—E.B.P.]

3. **M. prosaeles,** sp. n. Plate XVII, figs. 2 and 3.

Smaller and more shining than the previous two species. Abdomen distinctly shining and without silvery patches. Frons much narrower in male. Vibrissal angle more projecting.

♂. Frons only about twice as wide as third antennal joint is deep, dull brown, but varying from almost black to dull greyish brown according to the point of view. Frontal lunule with a pair of distinct bristles. Face very short, no longer than third antennal joint is deep. Both face and frontal lunule appearing silvery from some points of view. Vibrissal angle more projecting and the cheeks between face and eyes wider. A single vibrissa followed by a rather widely spaced row of short bristly hairs towards back of head. Palpi dark brown or reddish brown and pubescent, dilated leaf-like, but of a more even width throughout instead of being triangular as in the previous species. The long, very pointed, slightly hairy paraglossae of proboscis may project straight out between palpi, or be bent back and point towards prothoracic sternum. Antennae with third joint reddish brown, arista shorter than in the previous species and only microscopically pubescent. Thorax rather shining, dark brownish black; pleurae and hind part of disc in front of scutellum dusted greyish. Chaetotaxy as in *argyratoides* except that middle bristle of the three supra-alar bristles is not in a line with other two but placed rather higher up on disc. Abdomen very distinctly shining and blacker than thorax, the black hairs short and not very numerous. Tergites extremely narrow on first three segments, widening out into a triangle on fourth, and still wider on fifth, segment. Legs with the knee joints very narrowly, and the joints of coxae and trochanters indistinctly yellowish, hind femora at base with a long, fine, postero-ventral, bristly hair. Wings short and rather broad, faintly tinged with brown and distinctly brownish along the costa from humeral cross-vein to end of subcostal vein. Cross-vein closing discal cell not so sloping as in *proecles;* last portion of discal vein about two-thirds length of

penultimate portion and slightly diverging from cubital vein. Squamae and halteres dark, the latter with a yellowish base to stem.

♀. Resembling the male but frons nearly twice as wide and very faintly shining. Abdominal tergites of more equal width throughout.

Length barely 3 mm.

One male and five females.

[Two specimens, a ♂ and ♀, formed part of the material captured at Moor Plantation, near Ibadan, S. Nigeria, Dec. 23, 1917, to Jan. 26, 1918, and sent to illustrate Farquharson's notes in Proc. Ent. Soc., 1918, pp. xxxiii, xxxiv, xl. The remaining 4 ♀♀ were captured in the same locality, in May, 1918, on the evidence of a letter of May 28 (see p. 445). They formed part of a set of "absolutely guaranteed mendicants" (pp. 445–46), soliciting food from *Cremastogaster* ants.—E.B.P.]

4. **M. dectes**, sp. n.

Closely resembling *M. prosactes* but wings without the brown streak along costa at base of wing, and thorax and abdomen more densely pubescent.

♂. Frons nearly double as wide as in *prosactes* ♂ and with the bristles (especially ocellar and vertical) longer. Thorax blacker, without the slight brownish tinge of *prosactes* and with more numerous short hairs; notopleural depression and disc of scutellum with a greyish tinge in some lights; supra-alar bristles almost in a straight line. Abdomen with a distinct greyish tinge about the base of the second segment except at the sides; the short black hairs with which the abdomen is clothed very much more numerous. Tergites of moderate width throughout. Wings without any indication of the brownish costal streak of *prosactes*.

♀. Resembling the male, frons only slightly wider than in *prosactes* ♀. The greyish tinge about the base of second abdominal segment not so conspicuous as in the male. Slightly smaller than *prosactes*.

Two males and four females.

[A single ♀ formed part of the material of Dec. 23, 1917 to Jan. 26, 1918, and the remaining 2 ♂, 3 ♀ a part of the series of "absolutely guaranteed mendicants," as described under *M. prosactes*.—E.B.P.]

5. **M. farquharsoni**, sp. n. Plate XVII, figs. 4–6.

Superficially somewhat resembling the two previous species, but with the second antennal joint longer, a

proboscis of remarkable structure, and different thoracic chaetotaxy and costal lobe.

♀. Head rather wider than thorax. Eyes microscopically pubescent. Frons almost a third the width of head, parallel-sided, brownish, and dull on the broad central stripe and at vertex, more greyish and slightly shining on the narrow orbits next to eye-margin. Chaetotaxy as in other species. Frontal lunule small, shining, the usual pair of bristles very short and fine. Face only slightly narrower than frons, longer than in any of the other species, flat and dull greyish. Cheeks rather distinct, of almost equal width throughout and merging into the jowls which become very narrow at lower margin of eyes. No distinct vibrissae—only a row of short fine hairs. Antennae placed very close together at base, first joint very short, indistinguishable on the outer side but visible as a ridge on the inner and lower sides; second joint long, dull brownish black, almost as long as the third joint which is rounded in outline and strongly compressed laterally; inner side of second and third joints clothed with a curious soft fine curved pubescence; third joint yellowish brown at least about the base. Arista microscopically pubescent, second joint long. Palpi greyish brown, of almost equal width throughout and laterally compressed, closely approximating at the upper mouth-margin and then widely diverging, this diverging portion being somewhat concave on the inner side; the margin of this concave part and the whole of the lower side of the palpi clothed with similar soft fine curved pubescence as on inner side of antennae. Proboscis geniculate, the basal part much flattened, bare on the central part but clothed with short dark hairs at the sides, terminal part (paraglossae) of a curious shape, compressed laterally and bearing on the upperside towards tip some remarkable long bristly hairs.

Thorax rather dull brown with an aeneous tinge; pleurae dusted greyish. Chaetotaxy as in the other species except for the absence of the posthumeral, supra-alar (as distinct from postalar) and central prescutellar, bristles. Abdomen brilliantly shining black except on the first segment and a large dull greyish patch occupying the greater part of disc of second, and (to a rather less extent) of third segment; the moderately short black hairs, scattered, not very numerous, and more upright on fifth segment.

Legs black with the tip of anterior tibiae and all tarsi (except for the last joint or two) yellowish, but the front tibiae are brownish yellow on basal part, and the hind tarsi are rather brownish on the basal joint. Hind tibiae with a rather sinuous antero-dorsal ridge, behind which is a flattened and slightly concave space, brilliantly

shining, with violet reflections, down which runs a single row of short black bristles. Wings with a faint yellowish tinge and yellow veins. End of subcostal vein sharply marked black, emphasised by the fact that the costa just before the break at this point is produced into a black lobe. Small (discal) cross-vein opposite end of subcostal vein, ends of cubital and discal veins distinctly converging, and last portion of latter vein distinctly longer than penultimate portion. Squamae dusky with pale brown fringes. Halteres black with brownish-yellow stems.

Length barely 3 mm.

Five females.

[All the specimens formed part of a set of "absolutely guaranteed haunting flies," captured in May, 1918, on the evidence of a letter of May 28 (see p. 445), at Moor Plantation, S. Nigeria. These flies were haunting the carton nest of *Cremastogaster* ants as described on pp. 445–46. They were not seen to receive food from the ants like the other species here described.—E.B.P.]

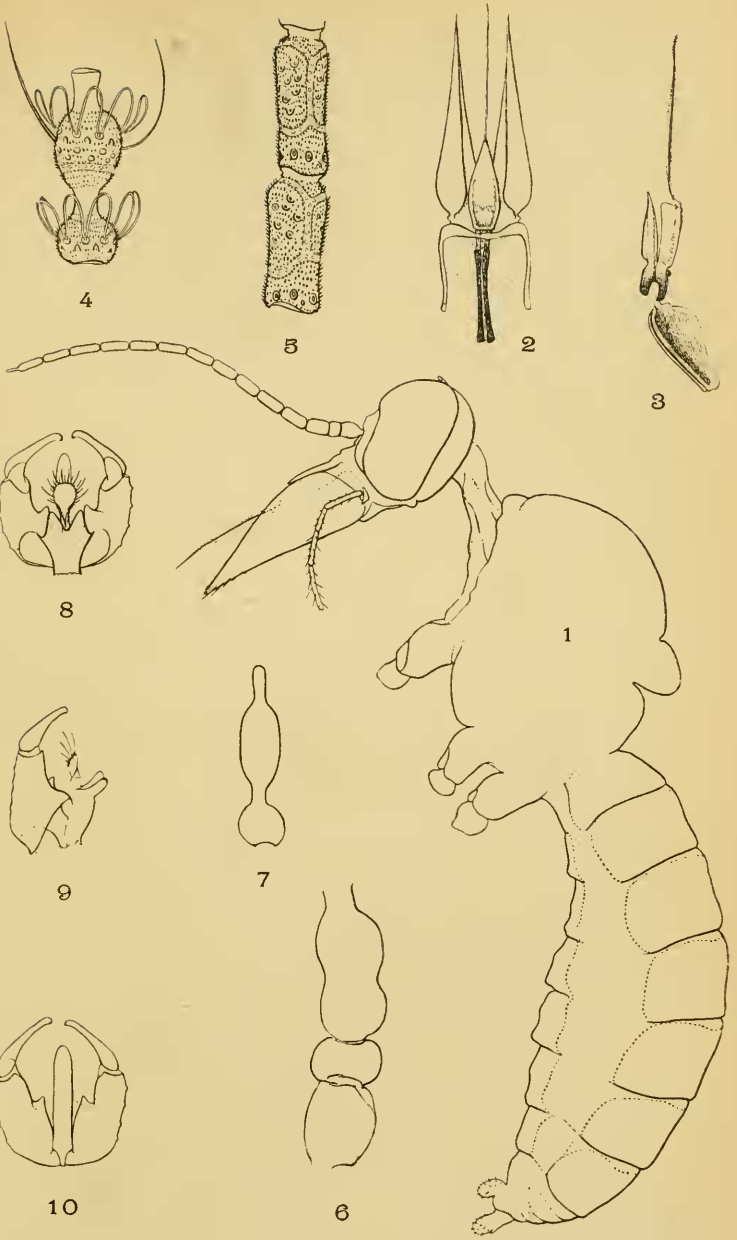
Explanation of Plate XIV.

PLATE XIV.

Farquharsonia rostrata, sp. n.

Fig. 1. Outline of female × 33.
2. Mouth-parts of female from in front × 40.
3. Side view of labrum, hypopharynx, etc. × 40.
4. One of the middle joints of male antennal flagellum, much enlarged. (Only one of the straight and one of the curved bristles figured.)
5. One of the middle joints of female antennal flagellum, much enlarged. (No bristles figured.)
6. Outline of first three joints of male antenna, much enlarged.
7. Outline of terminal antennal joint of male, much enlarged.
8. Hypopygium of male from above × 60
9. Hypopygium of male from right side × 60.
10. Hypopygium of male from beneath × 60.

} Bristles on basal joint of forceps not figured.



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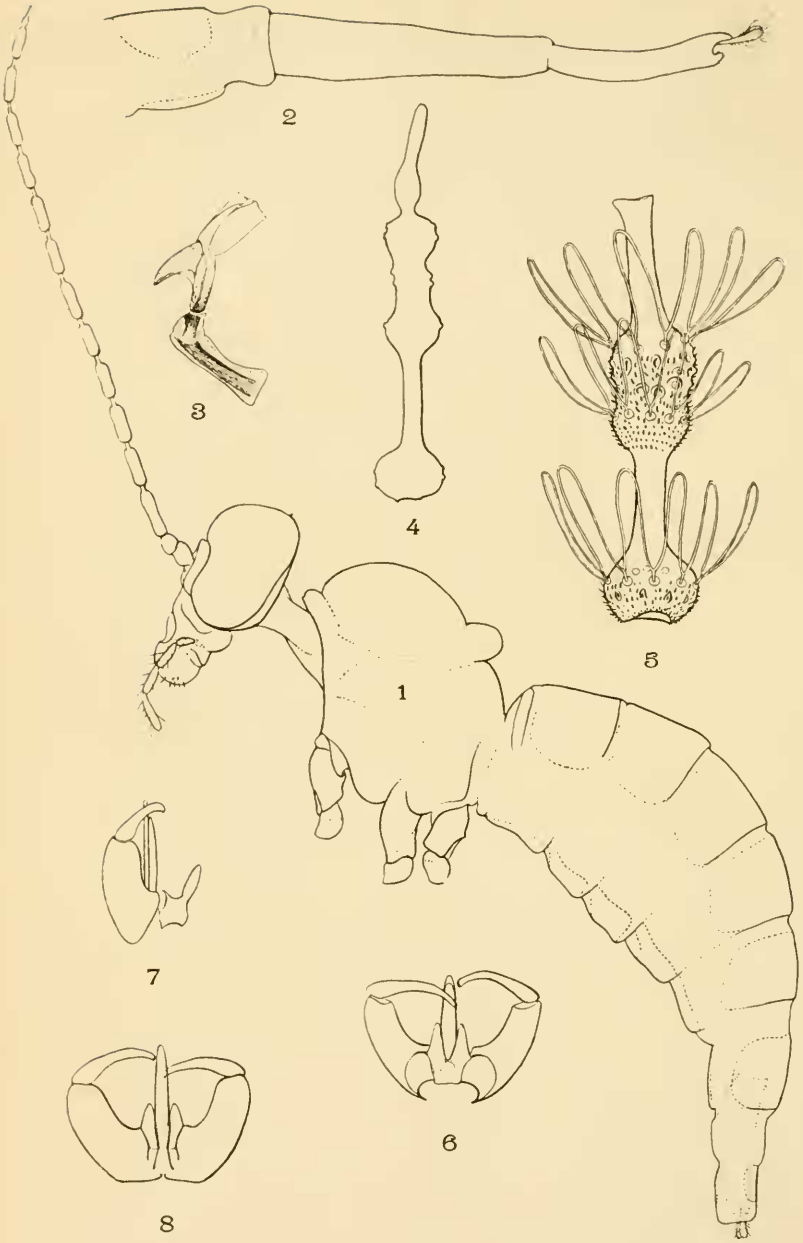
FARQUHARSONIA ROSTRATA, A S. NIGERIAN CECIDOMYID.



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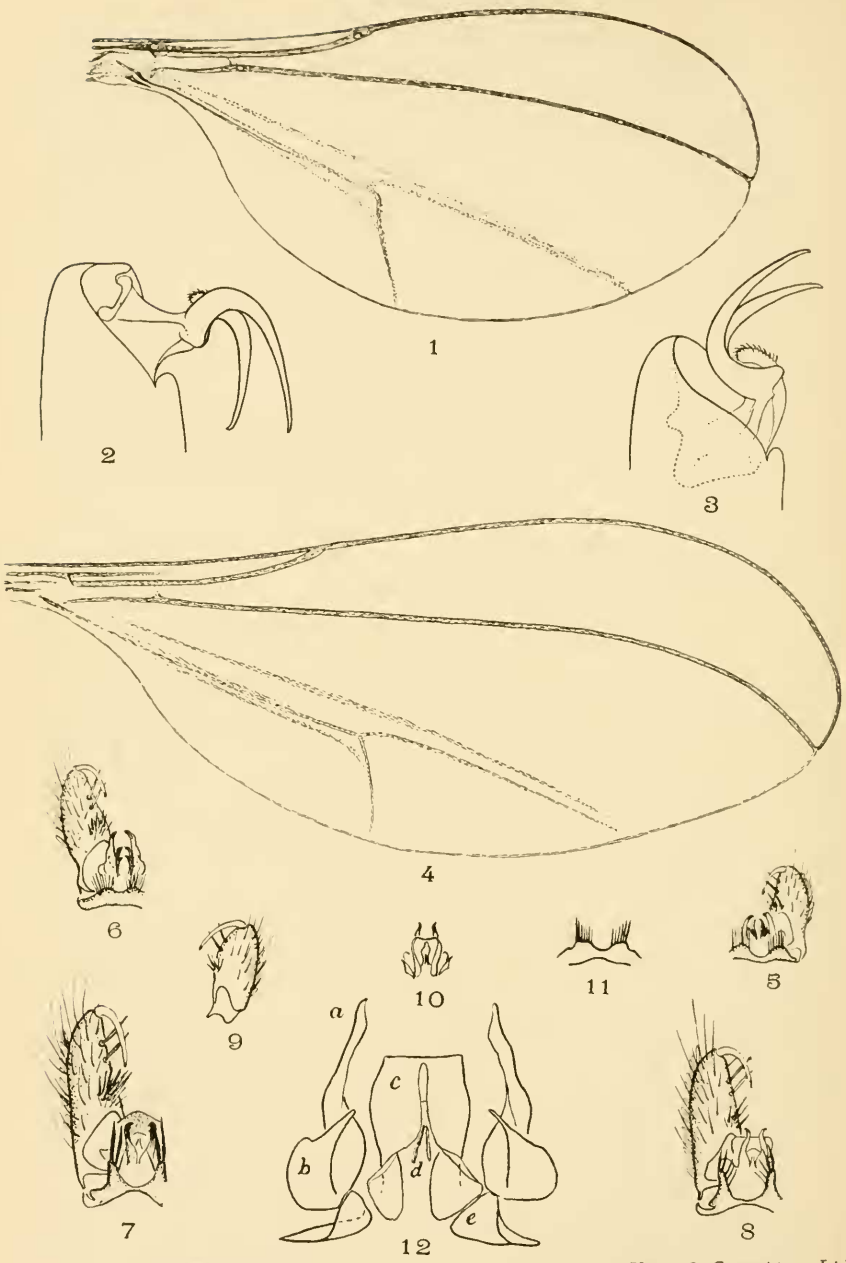
CHAETODIPLOSIS GYMNASTICA, A S. NIGERIAN CECIDOMYID.



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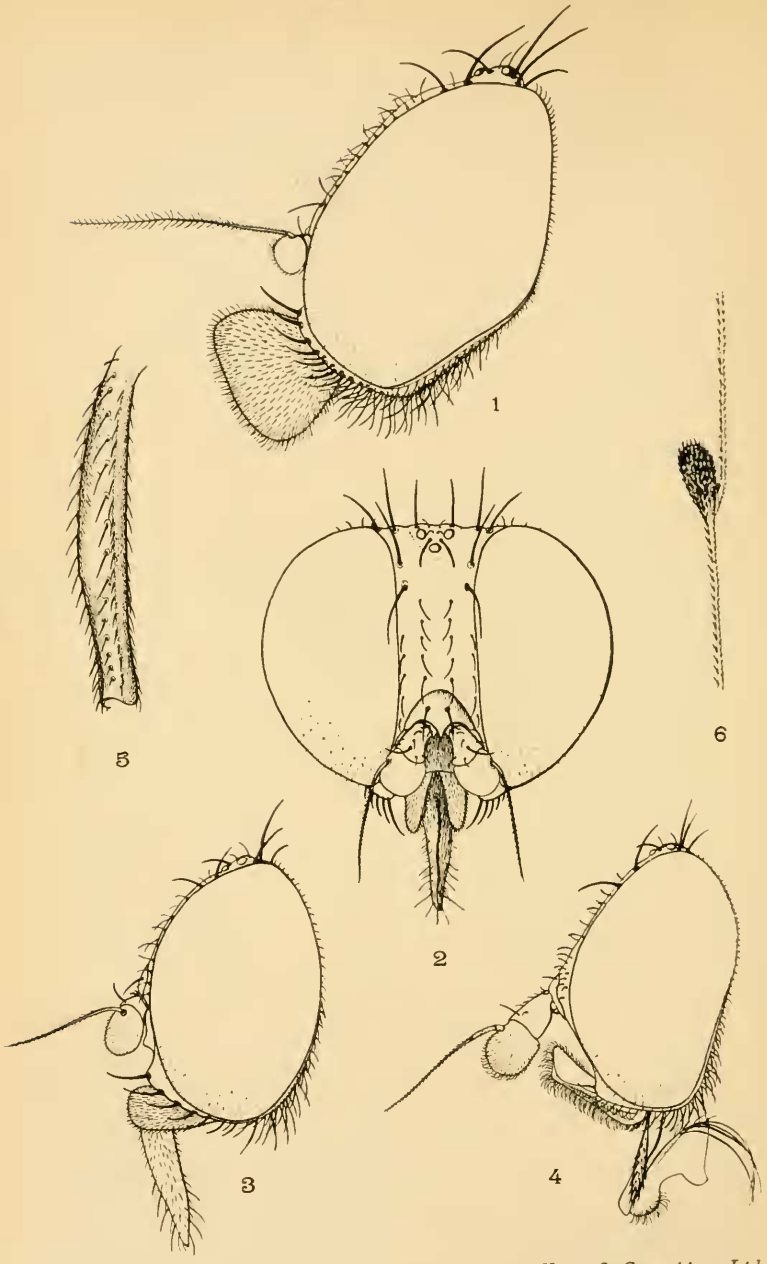
FARQUHARSONIA (1), CHAETODIPLOSIS (2-4), AND HARPAGOMYIA (5-12).



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S. NIGERIAN SPECIES OF MILICHIA (Diptera).

Explanation of Plates XV, XVI (Figs. 1–4), XVII.

PLATE XV.

Chaetodiplosis gymnastica, sp. n.

Fig. 1. Outline of female × 33.
2. Female ovipositor extended × 40.
3. Side vein of labrum, hypopharynx, etc. × 60.
4. Outline of terminal antennal joint of ♂, much enlarged.
5. One of the middle joints of male antennal flagellum, much enlarged. (No bristles figured.)
6. Hypopygium of male from above × 60.
7. Hypopygium of male from right side × 60.
8. Hypopygium of male from beneath × 60.

Bristles on basal joint of forceps not figured.

PLATE XVI (Figs. 1–4).

Fig. 1. *Farquharsonia rostrata.* Wing venation × 33.
2. *Chaetodiplosis gymnastica.* Ungues extended, much enlarged.
3. „ „ Ungues at rest, the base withdrawn into the end of the tarsal joint as indicated by the dotted lines, much enlarged.
4. „ „ Wing venation × 33.

(For explanation of figs. 5–12, illustrating Mr. F. W. Edwards' paper, see p. 503.)

PLATE XVII.

Fig. 1. *Milichia argyratoides* ♂. Profile of head × 23.
2. „ *prosaetes* ♂. Front view of head × 23.
3. „ „ ♀. Profile of head × 23.
4. „ *farquharsoni* ♀. Profile of head × 23.
5. „ „ ♀. Left hind tibia from above × 33.
6. „ „ ♀. Costa at end of mediastinal vein viewed from front edge of left wing × 33.

XIII. *Descriptions de six Tachinides nouveaux d'Afrique.* Par le Dr. J. Villeneuve.

1. **Exorista poultoni**, n. sp.

♂. D'un noir brillant, oblong. Epaules et tête à enduit gris jaunissant et mat; péristome ardoisé; thorax à légère pruinosité grise en avant, sur laquelle apparaît l'origine de trois fines lignes noires médianes, distantes; scutellum largement rougeâtre au bord libre; abdomen rougeâtre sur les flancs des segments II et III. Antennes allongées, un peu plus courtes que le clypéus, noires ainsi que les palpes qui sont assez épais au bout. Pattes noires, à griffes antérieures longues. Ailes hyalines, jaunies à la base; cuillerons amples, jaune d'œuf; balanciers à massue obscure.

Vertex large comme 2/5 d'œil. Une seule soie verticale; soies ocellaires aussi développées que les 2 paires de soies frontales ascendantes; 4 soies descendant sur les gênes jusqu'au niveau du chète antennaire, celui-ci ayant le 1er article distinct, le 2e nettement allongé, le 3e épaissi dans sa première moitié. Occiput sombre, avec quelques rares cils en arrière des cils rétrooculaires. Péristome à peine large comme le vertex. Yeux à longue pilosité blanchâtre.

Thorax: 4 soies dorsocentrales; 2 + 2 soies sternopleurales.

Scutellum: 4 soies longues, de chaque côté; les apicales croisées.

Abdomen: 1er segment excavé à fond; segments I et II ayant 2 soies marginales médianes, courtes et plutôt faibles, III et IV avec une rangée complète de soies longues et robustes. Pas de soies discales sur les 3 premiers tergites.

Pattes: tibias postérieurs à cils fins et à peu près réguliers, mêlés d'une longue soie médiane.

Ailes: 3e nervure portant 2 cils à son origine; coude de la nervure IV presque à angle droit; transverse apicale modérément arquée; transverse postérieure oblique, à peine sinueuse. Pas d'épine costale.

Taille: 8 millim.

[The unique type bears the label "ex Pterocarpus Lycaenid." It was bred at Moor Plantation, near Ibadan, in March, 1917, probably from *Deudorix diyllus*, p. 382.—E.B.P.]

2. **Hilarella helva**, n. sp.

Port et taille de *H. stictica* Meig., mais d'un jaune chamois clair sur l'abdomen qui ne présente ni taches noires latéro-dorsales ni taches latérales, seulement une bande grisâtre médio-dorsale sur

laquelle tranchent les pores largement auréolés de noir profond des 2 macrochètes médians; thorax et scutellum d'un gris jaunissant uniforme, de même sur les gênes, tandis que le front est un peu doré. Palpes jaunes. Cuillerons ocracés. Pattes brunes, à tibias testacés.

[The unique type was bred on June 20, 1915, from a Noctuid larva, the prey of *Ammophila beniniensis*, as described on pp. 426–27. Locality: Moor Plantation, near Ibadan.—E.B.P.]

3. **Tricyclea evanida**, n. sp.

♀. De taille moyenne, entièrement d'un jaune pâle à l'exception: (1) d'une large bande cendrée sur le thorax où elle occupe l'espace compris entre les soies dorsocentrales, en le débordant un peu; (2) du mésophragme entièrement noir; (3) d'une bande noire postérieure sur les segments abdominaux II et III, bande assez large qui donne un prolongement médian triangulaire n'atteignant pas le segment précédent et qui s'amincit vers les flancs pour devenir étroite sous le ventre. Le dernier segment est marqué à ses 2 angles postérieurs d'une tache noire transversale.

L'occiput, noirâtre et plus ou moins poudré de gris, est assez largement bordé de jaune derrière les cils retrooculaires. Ces cils s'arrêtent, en bas, au niveau du bord inférieur des yeux et, de là, s'étendent sur la partie supérieure du péristome. Ailleurs, le péristome est couvert de poils blancs, sauf à l'angle postérieur où quelques longs poils noirs font suite aux soies du bord inférieur.

Les palpes sont dilatés au bout en raquette.

Ailes hyalines, sans épine costale et sans aucune tache noire; cuillerons et balanciers presque blanchâtres.

4 soies dorsocentrales. 3e tergite abdominal avec une rangée complète de soies marginales parfois couchées; 4e tergite avec quelques soies disco-latérales qui sont dressées ainsi que la rangée des soies apicales: toutes ces soies sont développées.

Taille: 7–8 millim.

Plusieurs femelles de la Nigeria, de l'Ouganda et de la Côte-d'Or.

[A single *evanida* was found by Dr. Villeneuve among 5 ♀ Tricycleas bred by Farquharson in October or early November, 1917, from larvae referred to in the following note:—

"*Dec.* 12, 1917.—Another tube contains some other Dipterous larvae of which imagines are sent. These feed on the débris that is piled up round the nest openings of

the ant *Paltothyreus*. The little mounds were simply heaving with these maggots. I was only able to breed out a few before I went travelling." [See p. 436.]

Of the remaining 4 ♀ bred from Farquharson's larvae Dr. Villeneuve wrote Apr. 9, 1920 :—

" Les 4 premiers exemplaires sont *T. exarsa*, bien pareils au type de Brauer-Bergenstamm, qui est encore chez moi, et au type de Guérin-Méneville de la collection Macquart, étiqueté aussi '*exarsa* W.' et qui est aussi chez moi."

Concerning the ♂ of *T. evanida* and *exarsa*, Dr. Villeneuve wrote, also on Apr. 9, 1920 :—

" Le ♂ ayant une bande brune le long de la moitié distale de la nervure II de l'aile, n'appartient pas certainement à *T. evanida*, mais est très probablement un ♂ de *T. exarsa* B.-B. IMMATURE. J'ai trouvé le vrai ♂ de *T. evanida* ; son aile est pareille à celle de la ♀, c'est à dire sans aucune tache ni bande."

Inasmuch as nothing is known (Proc. Ent. Soc., 1914, p. v) of the life-history of *Tricyclea*, v.d. Wulp (=*Zonochroa* B.-B.) it is very satisfactory to know that the larvae of *T. evanida* and *exarsa* have been found in the débris of *Paltothyreus tarsatus*, and that the three following new species have been seen to oviposit in and round the nest openings of Driver ants (*Dorylus*).—E.B.P.]

4. Tricyclea semithoracica, n. sp.

♂♀. De taille moyenne ou plus petite, d'un jaunâtre terne, à l'exception : (1) d'un espace noirâtre occupant la partie comprise entre les soies intraalaires, depuis la suture jusqu'au scutellum ; ce rectangle noir est parfois étroitement échancré au milieu de son bord antérieur ; (2) du mésophragme noirâtre ; (3) des dessins noirs des tergites abdominaux, à savoir : une bande étroite de chaque côté du tergite I, sur son tiers externe—une bande plus large, complète, élargie en triangle à sa partie médiane jusqu'à rejoindre le tergite précédent, distingue le tergite II—les tergites III et IV sont presque entièrement noirs, le premier n'ayant plus de jaune que les angles antérieurs et le second qu'une tache médiane apicale.

L'occiput est noirâtre entièrement ; les cils noirs rétrooculaires descendent jusqu'aux soies du péristome qui est lui-même couvert de poils noirs épars.

Palpes en massue.

Ailes à deux taches noires le long du bord antérieur, l'une occupant la cellule médiastinale et la débordant jusqu'à joindre la nervure II, l'autre tache allongée et entourant l'extrémité de cette nervure.

L'espace clair qui les sépare est à peu près de la longueur de la tache médiastinale. Au-delà de la nervure II, le rebord costal de l'aile est étroitement ombré, davantage à l'extrémité de la 1ere cellule postérieure. Cuillerons à peine ocracés; balanciers jaunâtres.

4 soies dorsocentrales—les 2 derniers tergites abdominaux bordés de soies raides, espacées et peu longues; les soies disco-latérales du tergite IV débiles.

Le ♂ a les yeux joints, à facettes ordinaires.

Taille: 6–7 millim.

Je connais cette espèce de la Nigeria et de la Côte-d'Or.

[W. A. Lamborn's material, submitted to Dr. Villeneuve, included 4 ♀ of this species, observed on Dec. 10, 1913, to be dropping their ova into and between the openings of a temporary nest being constructed by Driver ants (*Dorylus*) at Moor Plantation, near Ibadan, S. Nigeria, as described in Proc. Ent. Soc., 1914, pp. v–vii. Farquharson had directed Lamborn's attention to the ants and thus prompted the observation.—E.B.P.]

5. **Tricyclea verticella**, n. sp.

♂♀. Jaune, ayant le thorax entièrement noir en dessus, à l'exception des épaules et d'une étroite bande latérale qui restent jaunes jusque près de l'insertion des ailes; pleures maculés de noirâtre. Scutellum largement noir à sa base. Abdomen légèrement brillant; les tergites ont chacun une bande marginale noire: étroite et largement interrompue sur le segment I, large et complète sur les segments II et III où elle s'amincit un peu latéralement, réduite à 2 taches apicales sur le segment IV.

Le mésophragme et l'occiput sont entièrement noirs; la même coloration s'étend sur le vertex et couvre fréquemment la moitié postérieure du front.

La disposition des cils rétrooculaires et la vestiture du péristome sont comme dans l'espèce précédente; les palpes sont également en massue.

Les ailes, un peu sales, ont une tache noire occupant toute la cellule médiastinale et reposant sur la nervure II, puis, séparée de la première par un court espace clair, une autre tache brune, très allongée, enveloppant l'extrémité de la nervure II et continuée par une zone ombrée plus claire le long de la côte jusqu'à la terminaison de la 1ere cellule postérieure. Cuillerons sales; balanciers testacés.

Les pattes ont l'extrémité distale des fémurs postérieurs et les tibias correspondants plus rembrunis que dans la plupart des espèces du genre *Tricyclea*.

Normalement, 3 soies dorsocentrales développées; entre la 1ère et la 2e, une soie plus courte et plus faible est interposée. Les soies marginales du tergite abdominal III sont courtes et couchées, mais robustes et longues latéralement; celles du dernier tergite sont développées, tandis que ses soies disco-latérales sont courtes ou débiles.

Le ♂ a les yeux joints, à facettes ordinaires.

Taille: 5–7 millim.

Nombreux individus de la Nigeria, un de l'Ouganda et un du Congo belge.

[A single ♀ of *T. verticella* was found by Dr. Villeneuve in Lamborn's material illustrating the observations summarised under *T. semithoracica*.—E.B.P.]

6. **Tricyclea perpendicularis**, n.sp.

♀. Cette espèce est comme intermédiaire entre les deux précédentes. De *T. verticella*, elle a le scutellum à large tache basale noire, l'abdomen de même coloration et à soies identiques. Comme chez *T. semithoracica*, les ailes hyalines ont 2 taches noires et disposées de la même manière; les pleures sont pâles avec la seule tache noire habituelle, l'hypopleurale; le thorax montre tout le tergum d'un gris bleuté en arrière de la suture, avec cette différence qu'il s'en détache une bande médiane de même couleur qui s'avance dans l'espace compris entre les soies acrosticales présuturales; la tête, enfin, est la même.

Palpes en massue—4 soies dorsocentrales.

Taille: 5–6 millim.

2 ♀ de la Nigeria méridionale.

[A single ♀ of this species also was found by Dr. Villeneuve in the material which contained *verticella* and *semithoracica*. All three species therefore are known to be attracted to Driver ants and to drop their eggs into and between the funnel-shaped openings of a temporary nest. The ants did not appear to notice the eggs, "but in the natural course of their work gradually covered them with earth." (Proc. Ent. Soc., 1914, p. vi.) This material had been submitted to Major Austen, who separated the three species exactly as Dr. Villeneuve has done.

Two other Diptera also ovipositing, although in a different manner, among the Driver ants on the same occasion (*ibid.*, p. vii) were also submitted to Dr. Villeneuve who has kindly written the following note, also confirming, and

in *Rhinia* carrying somewhat further, Major Austen's conclusions.

" Quant à *Rhinia apicalis* Wied., vera, c'est la variété avec une tache obscure à l'extrémité de l'aile. Ici, c'est la variété ' *testacea R.D.*, 1830 ' : l'aile et l'abdomen n'ont aucune tache noire sur votre specimen.

" L'Anthomyide paraît être du genre *Limnophora ;* il est en trop mauvais état pour être déterminé."—E.B.P.]

XIV. *Description of a peculiar unidentified Dipterous Larva possessing a number of enigmatic truncate Abdominal Organs.* By J. Bronté Gatenby, D.Phil., D.Sc., Professor of Zoology, Trinity College, Dublin, Senior Demy, Magdalen College, Oxon.

Plate XVIII.

Among the material sent to Prof. E. B. Poulton by Mr. C. O. Farquharson was a small unidentified larva believed to be a Syrphid. Cursory examination of this larva showed that it possessed, on the ventral surface of the last third part of its body, a number of peculiar tubes arranged in two bunches set side by side. The ultimate region of the abdomen was found to bear a tracheal funnel, in somewhat the same manner as the larva of *Eristalis tenax*. In the unidentified larva, however, the funnel did not seem to be extrusible and extensile as in the rat-tailed Syrphid larvae. In Plate XVIII, fig. I, the larva is drawn to the centimetre scale given above. In front were two processes, short and with few joints, which were the antennae; the mouth-parts did not appear to be abnormal. From 1*a* to 6*a* in this figure were six pairs of processes surmounted by numbers of hooklets as in the *Eristalis* larva. Behind the last pair of leg-processes were found the truncate organs already mentioned (Plate XVIII, fig. I, Tu). In fig. II the organs on one side are drawn at a higher power. Each one was seen to have at its extremity a minute pore. Just behind the region of the truncate organs the body tapered sharply, but before passing on to the tracheal funnel it gave rise to two lateral, backwardly directed obtuse processes (PR in fig. I).

The entire surface of the larva was covered with raised processes or rugosities, and the epidermis was markedly thick and pigmented towards the hind regions, somewhat like the *Eristalis* larva. Nothing of special interest was found in connection with the nervous or alimentary system, but the latter was of the complicated type found in many Dipterous larvae. The anus opened in the region of the truncate organs between the two bunches, so that the trunk-like tubes are really peri-anal. The two lateral tracheal tubes open behind at TT in fig. I. There are no

lateral stigmata, but there is apparently a pair in the head region as in the *Eristalis* larva.

The hind regions of this larva were sectioned in order to examine the truncate tubes. In Plate XVIII, fig. IV, there is drawn a transverse section of the body in the region of the tubes; one of the latter is cut in longitudinal section, while two others, at DP, are just in the section. In fig. IV it will be noticed that the tube is hollow, from the pore upwards, to the place marked by the legend Tip. At this region the main tube is seen to be folded again to form an inner tube; to the inner tube are fixed some muscle bands at M; these are attached to the body-wall of the larva in the region of the tubes. Inspection of fig. IV at once shows that each tube is really arranged so as to be eversible by pressure of the fluid of the body, and the muscle at M functions in redrawing the tube when once everted. In fig. V the tube is diagrammatically represented as half everted, the tip (Tip in fig. IV) being now outside; in fig. VI the eversion is complete. The attachment of muscle is at MA.

It was found that the hypoderm cells of the truncate tubes were very large and glandular.

Probable Function of Eversible Truncate Organs.—In fig. III is a diagrammatic drawing of a larva with its tracheal funnel above water taking in air; the eversible organs are shown protruded to their fullest extremity. There seems little doubt that these organs, connected as they are with the haemocoel, and everted by haemocoelic fluid pressure, serve as additional respiratory organs, when the larva is in water too deep to enable it to use its tracheal funnel. A less likely suggestion might be that the organs are used for climbing and adhering to water-weeds.

Systematic Position of Larva.—Until the fly is bred from this larva, it will be impossible correctly to place it in its position, but in arrangement of legs, in the appearance of the integument, in the shape of the body, and in the tracheal apparatus, this larva shows undoubted affinities with the form *Eristalis*.

[The following extracts from Farquharson's letters confirm Prof. Gatenby's suggestion that the protrusible processes are respiratory in function.—E.B.P.]

Dec. 12, 1917.—You will remember my telling you of the (?) Syrphid larva with the curious protrusible process, that I found in the decaying banana leaves in water. I

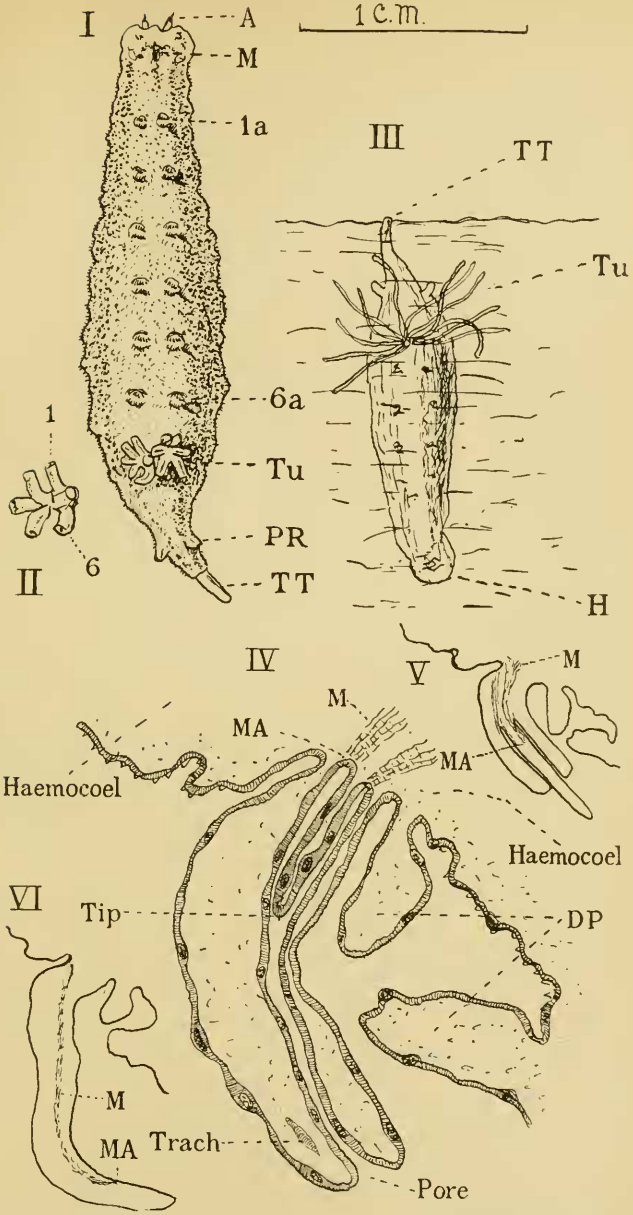
have failed to breed out the imago so far, but hope to have another try. The specimen sent shows the organ—a fusion, I think, of a pair—extruded, but much contracted in the spirit. In life it was quite transparent with branched silvery lines running out to the tips of the fingers or lobes. These I believe to be tracheae. I will send more larvae when I can get them.

Aug. 11, 1918.—I am sorry that I overlooked those Syrphid larvae. I will place "baits" of pieces of cut banana stem in putrid water for them, and, if I get any started, I shall try to leave them with Dr. Connal to complete the life-history if they do not pupate before I go. I thought that the white "line," running out into each lobe of the curious organ, was a trachea or branch of one, as I think I mentioned at the time. The organ shrinks in spirit, but in life it was a very pretty structure, the lobes being quite translucent with the silvery white line running out to the end of each. The whole organ can be withdrawn out of sight inside the body of the larva. I think I will manage to fix that little problem up all right.

Note (*October 1921*).—Prof. E. B. Poulton, whom I have to thank both for the opportunity of examining this material, and for encouraging interest during the work, has drawn my attention to Mr. Farquharson's reference to "silvery lines" running down the tubes. These lines I think must be the muscles marked M in fig. VI, and not tracheae, as one might naturally expect.—J. B. G.

Plate XVIII.

[*For Explanation of Figs.* I–VI *see accompanying text.*]



J. B. Gatenby del. *Vaus & Crampton, Ltd.*

A S. NIGERIAN AQUATIC DIPTEROUS LARVA
(? Syrphidae).

E. THYSANOPTERA.

XV. *Notes on Selenothrips rubrocinctus Giard, taken by C. O. Farquharson on a Forest Tree at Agege, near Lagos.* By R. S. Bagnall, F.R.S.E., F.L.S.

Selenothrips rubrocinctus Giard.

Physopus rubrocincta Giard, 1901.
Heliothrips rubrocinctus Franklin, 1908.

This species is a great pest of Cacao in the West Indies and is also known from Ceylon. It was described fully by Franklin in 1908. Its specific name is due to the broad band of bright red (almost crimson) hypodermal pigmentation running across the base of the abdomen in the larva. At a later date Karny wrote upon his conception of the divisions of the genus *Heliothrips* (Revision der Gattung *Heliothrips* Haliday in Entom. Rundschau, Jahrb. 28, No. 23, pp. 179–182) and diagnosed the subgenus *Selenothrips* for the reception of *rubrocinctus*, and a new and closely allied form, *S. decolor* Karny, found on Cacao in New Guinea.

The presence of *S. rubrocinctus* on the W. Coast of Africa is particularly interesting in view of the fact that I have only recently received a supply of the other species, *S. decolor*, from the Gold Coast, where it is injurious to Cacao. *S. decolor* is most readily separated from *rubrocinctus* by the absence of the red hypodermal pigmentation at the base of the larval abdomen. There are also minute structural differences in the antennae.

[The specimens on which Mr. Bagnall's note was written were preserved in spirit. The following note accompanied them: "Rather large Thrips from bush tree at Agege. Immature forms run about with drop of dark liquid at posterior end.—Oct., 1917."—E.B.P.]

F. HOMOPTERA.

XVI. *A new Southern Nigerian Aleurodes* (*Aleurodidae*).

By Prof. R. Newstead, F.R.S.

Plate XIX, facing p. 531, Fig. 1.

Aleurodes africanus, sp. n.

Pupa Case (fig. 1*a*). Flat, broadly ovate, segmentation distinct; dorsum very finely rugose, the rugosities very narrowly separated by extremely fine striae arranged somewhat radially; anal furrow distinct. Fringe or other secretionary matter absent. Colour dark brown or black with a broad, clearly defined, translucent margin; stigmatic clefts and anal furrow dusky white and clearly defined; vasiform orifice pale yellow. Margin (fig. 1*b*) very faintly crenulated and with fine but well-marked sutures or striae. Dorsal pores (fig. 1*c*) small, forming an irregular series just within the striated border. Eye-spots (fig. 1*d*) small. Vasiform orifice (fig. 1*e*) somewhat subcordate; the operculum filling a little more than half the orifice; lingula, when fully extended, projecting almost to the distal margin of the orifice, densely setose and furnished with a pair of short spinose hairs arising from a subapical collar of chitin. Stigmatic clefts (fig. 1*f*) well defined, terminating with three short, dactyliform processes. Anal cleft (fig. 1*g*) with two pairs of processes; the distal pair similar to the corresponding ones in the stigmatic clefts; the proximal pair somewhat triangular.

Length, 1·2–1·3 mm.; width, 1·1–1·2 mm.

Larva, second instar. Narrowly ovate; margin similar to that of the pupa case. Vasiform orifice with the operculum transversely elliptic and not quite extending to the middle distance, central area of the distal edge very finely spinose; lingula as in the pupa. Anal furrow distinct, distal angles each with a slender spinose hair; there is also a similar spinose hair at the margin considerably in advance of them.

Length, 0·6–0·7 mm.

W. Africa: S. Nigeria, Moor Plantation, nr. Ibadan, May, 1917. C. O. Farquharson.

[The *Aleurodes*, attached to the under surface of the leaves of *Salacia* sp. (*Celastraceae*), in Farquharson's compound, formed the food of the carnivorous Noctuid (*Erastriinae*) larva of *Eublemma scitula* (pp. 407–408.—E.B.P.]

The pupa-case of this insect does not agree in all its details with any of the new genera erected by Quintance

and Barker.* I have therefore placed it in the genus *Aleurodes*, from which it differs, however, in having the "submarginal area" faintly separated from the "dorsal disk" and also in its form and colour.

* Classification of the Aleurodidae, U.S. Dept. Agr. Tec. Ser. No. 27, Pt. ii (1914.)

XVII. *A new Southern Nigerian Lecanium* (*Coccidae*).

By Prof. R. Newstead, F.R.S.

Plate XIX, Fig. 2.

Lecanium (Saissetia) farquharsoni, sp. n.

Female adult. Form hemispherical, or narrowly ovate and highly convex; margin very thick, forming a distinct rounded moulding or bead. Integument with a faintly matted surface when preserved in alcohol, due apparently to secretion or foreign matter, on the removal of which, by slight friction, the derm presents a polished appearance. Colour rich dark castaneous; immature examples dusky buff. Antennae of eight segments; the 3rd equal to or a little longer than the 2nd. Legs robust; anterior pair with an unusually long bristle on the trochanter; tarsus inclusive of the claw about equal in length to the tibia. Anal lobes (fig. 2*a*) forming together a distinctly pyriform outline, the distal margin being about half the length of the lateral and markedly rounded; distance from distal margin of the lobe to the anal margin of body one-fourth the entire length of the body. Anal cleft fused. Stigmatic clefts obsolete; spines three or four in number. Marginal spines (fig. 2*b*) of varying lengths and irregularly disposed, some of them more than twice the length of the longest stigmatic spines; some of them are quite simple; others are slightly frayed distally. Derm cells irregularly ovate closely packed together. Collectively they produce a reticulated pattern at the margins.

Length, 4–4·25 mm.; width, 3·50 mm.

Young adult ♀. Form more or less circular or broadly ovate with the front slightly narrowed or produced; dorsum low convex or more or less flat. Colour dusky buff or pale ochreous. Antennae (fig. 2*c*) of eight segments, the 3rd slightly the longest. Stigmatic clefts faintly indicated, spines (fig. 2*e*) similar to those in the old adult. Derm cells at the margin as in the mature examples, but much less pronounced in the central area. Anal cleft not completely fused, and placed in the same position relatively to the margin of the body, as in the old adult.

In the nymphs or second stage ♀ the anal cleft is not fused.

W. Africa: S. Nigeria, Moor Plantation, Dec. 1917. C. O. Farquharson.

[The Coccidae were found on a plant of *Imbricaria maxima* (*Sapotaceae*) and formed the food of a carnivor-

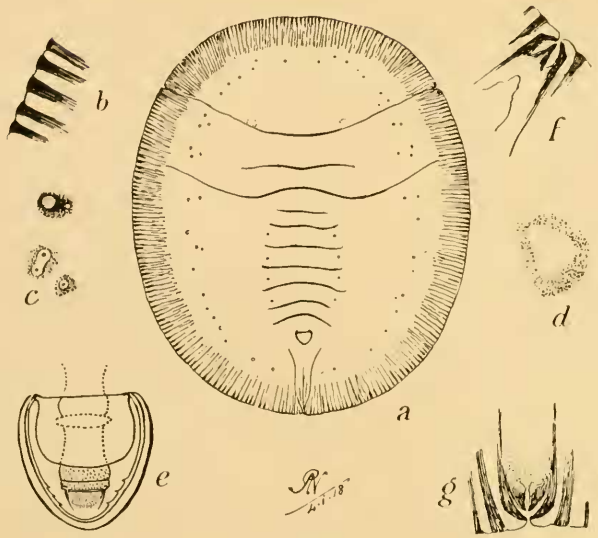


FIG. 1.

Fig. 1.—ALEURODES AFRICANA Newst.

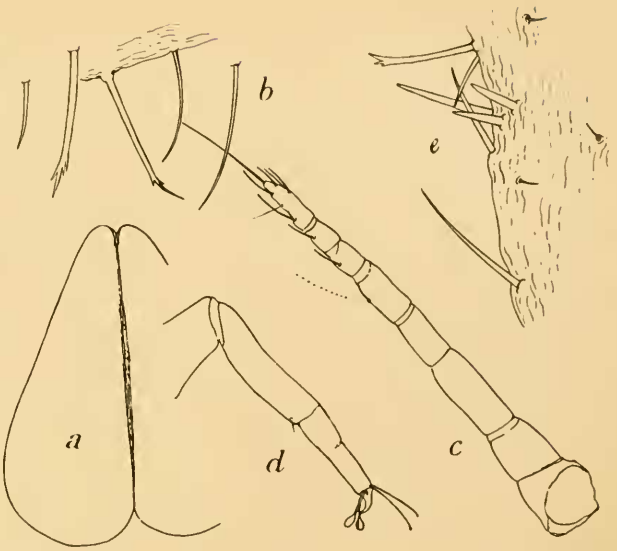


FIG. 2.

Fig. 2.—LECANIUM (SAISSETIA) FARQUHARSONI Newst.

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ous Lycaenid larva, *Triclema lamias* (p. 387). See also Proc. Ent. Soc., 1918, p. xxx.—E.B.P.]

In its general external facies this insect is inseparable from *Lecanium* (*Saissetia*) *somereni* Newst.,* but the anal lobes and marginal spines in *L. farquharsoni* are markedly different. In its structural details it is much more closely related to *L. calori* Green,† but the anal lobes are placed much nearer the margin of the body than in the last-named species; some of the marginal spines are distinctly though finely divided, laterally, towards the tips, and the longest stigmatic spines are shorter than the longest marginal ones.

* Mitteil. Zool. Mus. Berlin, V, pt. 2, p. 162, fig. 5 (1911). Bull. Ent. Res., Vol. IV, p. 76.

† Bull. Ent. Res., Vol. VI, p. 43, fig. 1 (1915).

Explanation of Plate XIX.

Fig. 1. *Aleurodes africanus* Newst.: *a*, pupa case; *b*, margin; *c*, dorsal pores; *d*, eye-spot; *e*, vasiform orifice; *f*, stigmatic cleft; *g*, anal cleft.

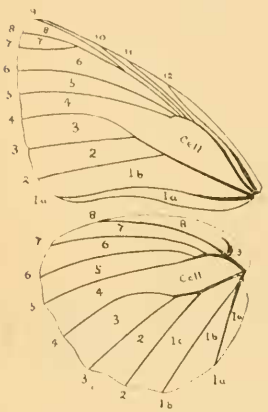
2. *Lecanium* (*Saissetia*) *farquharsoni* Newst.: ♀ adult: *a*, anal lobes; *b*, marginal spines. ♀ young adult: *c*, antennae; *d*, anterior legs; *e*, stigmatic spines: (*a*, *c* and *d* to the same magnification).

XIII. *On the African Species of the Genus* Neptis *Fab.* By H. Eltringham, M.A., D.Sc., F.Z.S.

Plates XX—XXV.

[Read Oct. 5th, 1921.]

The Genus *Neptis* was founded by Fabricius in 1807. It includes many species of small or medium-sized butterflies usually characterised by white or yellow markings on a sepia black ground-colour. Two species occur in Europe. The genus extends over the whole of the African and Oriental regions and into Australia. The wing neuration is as shown in the accompanying diagram. Its arrangement is fairly constant, though there is a certain instability in the point of origin of the tenth nervule in the fore-wing, which may arise at or beyond the end of the discoidal cell. The fore-feet are of the usual Nymphalid character, and serve as an easy method of distinguishing the sexes. The hind-feet have two simple claws, a well-developed pulvillus, and very rudimentary paronychia.



The characteristic patterns and markings of *Neptis* are such that the species are unlikely to be confused with those of any other genus except *Athyma*. If the example be a male, it may be distinguished as *Neptis* from the fact that the hind-wing costal nervure (8) ends on the costa in *Neptis*, whilst in both male and female *Athyma* this nervure ends on the hind margin. If it be a female, *Neptis* may be distinguished by the precostal nervure, which is straight where it arises from the costal, whilst in *Athyma* it follows a continuous curve from its origin; also in *Neptis* the subcostal nervures in the hind-wing arise much nearer to the costal than in *Athyma*. Further, in *Athyma* there is near the origin of the fore-wing median nervure a short spur on the inner marginal side. Such a spur is absent in *Neptis*.

The larvae are but little known. That of *dumetorum* will be described under that species.

The present paper is an attempt to deal with the forms and species of the Ethiopian region, though it cannot claim to be a complete revision, owing to lack of sufficiently long series of many forms. It may be that collectors generally, deceived by the great monotony of pattern and colouring, have neglected the genus in the belief that comparatively small series of specimens were sufficiently representative. It may be that some of the forms are really comparatively rare. In either case the fact remains that many species are but poorly represented in collections, whilst the difficulty of identification has led to numerous errors of nomenclature. So far no serious effort seems to have been made to investigate the relationships of the various described species, though at the same time, considering the fine distinctions and in some cases almost indescribable differences between what are really separate species, the literature of the genus is not wanting in certain shrewd diagnoses of their affinities.

As a problem in taxonomy the genus presents a number of difficulties, some of which in the absence of adequate material still remain unsolved. There are genera of Lepidoptera in which the male armature furnishes good and constant characters, enabling us to confirm or amend conclusions founded on outward and more easily observed features. In other cases we know that these anatomical structures are of so simple a nature that they are of little value in specific diagnosis.

In the African forms of *Neptis* we have in some instances instability of pattern combined with variability of anatomical structure, each condition tending to throw doubt on conclusions based on the other. Some species can be isolated with ease on well-differentiated characters of the male armature. In other cases we have forms very different in outward appearance, but not constantly distinguishable in the anatomical characters. If, for example, we take two forms A and B, of different pattern, and dissect and examine the genitalia, one mounted specimen of each may show recognisable differences. If, however, we take another example of A the armature may present differences from the first specimen of A, such differences being as great as those between B and the original A. Again, we may make preparations from two examples C and D, whose external

differences are of the slightest and by no means so great as the outward variations of undoubted forms of the same species, only to find that the respective armatures are so completely distinct that specific identity is out of the question.

Furthermore, there are forms, the external facies of which are so utterly different that we are bound to regard them as well-separated species, but the male armatures are not merely doubtfully distinguishable but of a highly complex form.

The form of the male armature also raises another question. Given several distinct types of structure in these organs, each type being broadly distinguishable from the others, how far are we justified in assuming that the members of the genus referable to one particular type of armature are necessarily more nearly related to each other than to species whose armatures fall under another type—that, in fact, they form an intra-generic group? If we do this with *Neptis* it is true that the majority of forms in groups so constituted seem fairly naturally associated, but at the same time there are instances in which two or more forms of totally different outward facies have armatures which are not constantly distinguishable. Thus *trigonophora* and *kikideli* are apparently widely separated, and yet it would be impossible to decide from a number of preparations which belonged to the former and which to the latter. This is not a question of a very simple structure of the armatures, since the claspers of these two species are of a curious form considerably elaborated and totally unlike those of any other African species.

A far more complicated case is that of the forms which include *ochracea*, *exaleuca*, *woodwardi*, *swynnertoni*, *incongrua*, and other species. At first sight the only difference between *exaleuca* and *ochracea* is that of colour. Grünberg on one occasion referred to an example of *ochracea* as *exaleuca* var. *ochracea*, a terminology I should have been inclined to support in the absence of anatomical preparations. Nevertheless, we find that whilst the claspers in *ochracea* are of fairly constant form, and that a peculiarly specialised one, those of *exaleuca* are extremely variable, though none of the variations resembles the clasper of *ochracea*. Close as is the resemblance between these two species in everything except colour, the clasper of *ochracea*, whilst apparently constantly distinguishable from that of

exaleuca, is not easily distinguishable from that of *incongrua*, *woodwardi*, *neavei*, and, most remarkable of all, *nemetes*. All these species are totally different in outward appearance from *ochracea* and from each other.

Again, the form described by Lord Rothschild as *neavei* is outwardly almost indistinguishable from the previously described *swynnertoni*, yet the armature of *swynnertoni* approaches that of *exaleuca*, to which species it has no outward resemblance whatever, whilst the claspers of *neavei* resemble those of *ochracea*, with which again there is no outward agreement. Where the structure of the armature is of a particularly simple kind and not subject to any characteristic elaborations no difficulty arises. Where, however, that structure is found to be highly modified, and also of a very distinct character as compared with other forms in the same genus, we should at first sight be tempted to suppose that those species possessing a distinctive type of armature were therefore closely related. But, as we now see, in the genus *Neptis* there are species whose armatures are most closely similar and highly specialised, which, to judge by their outward facies, are very widely separated. At the same time there are forms which appear nearly allied in their outward characters, but have markedly different genitalia.

Apart from the foregoing examples we have the difficulty of the forms of *nysiades* described more fully under the heading of that species.

Dr. W. J. Holland (Bull. Am. Mus. Nat. Hist., xliii, 6, p. 164, 1920) proposes a new genus, *Neptidomima*, in which he places one species *Neptis exaleuca*. He bases this separation on the structure of the palpi, which he describes as " more robust, porrect, and hirsute " than in any species known to him. It is true that the palpi in this species are densely clothed with flat scales, most of them black. The same, however, applies to the palpi in *woodwardi*, *ochracea*, *incongrua*, and some other species. If we are to take this character as generic, then the other species named must also be included in the new genus. Now, the genital armatures of these forms are of the same character as that of *nemetes*, certainly a true *Neptis*. For reasons stated above I cannot, in this genus at least, attach too much importance to the armature as a test of near affinity; nevertheless, the establishment of a separate genus for *exaleuca* and the other species with similar palpi

seems to me unnatural and based on very insufficient characters. As Heron pointed out years ago (see Trans. Ent. Soc., 1911, p. 7), the palpi of *Acraea johnstoni butleri* differ from those of other species of *Acraea*, including all the other forms of *johnstoni* itself. As *butleri* is merely a local form of *johnstoni*, we have here an example in which the difference in the palpi is not even a specific character. It is perhaps not irrelevant to add that the name *Neptidomima* is in any case undesirable, since it suggests a genus whose members mimic *Neptis*. Thus the generic names *Crenidomimas*, *Mimacraea*, *Pseudacraea*, etc., all have a significance which is well understood and supported by considerable evidence, whereas *Neptis exaleuca* and its allies, so far from being mimetic of other species of *Neptis*, are of all the genus the most aberrant in their facies.

In the descriptions it will be noted that several species have a pearly iridescent area on the underside of the h.-w. in the male. Special scales can be observed in this area, and my friend Dr. F. A. Dixey has kindly examined them for me. It would not, however, appear that they are of specific importance.

I have pleasure in acknowledging the kind assistance I have received from Dr. F. A. Dixey, F.R.S., Mr. J. J. Joicey, Dr. K. Jordan, M. Ch. Oberthür, Prof. E. B. Poulton, F.R.S., Mr. N. D. Riley, Lord Rothschild, F.R.S., and Mr. G. Talbot. I should like also to express my appreciation of Mr. Alfred Robinson's admirable photographs, from which the plates of imagines have been printed.

KEY TO THE AFRICAN FORMS OF THE GENUS *NEPTIS*.

(The sexes are alike in pattern.)

Some or all of the discal spots and bands of upperside yellow. *a*.

All paler markings above, white (rarely bluish). *g*.

(*a*) F.-w. cell on underside contains white dots, usually also visible above. *b*.

Cell without white dots. *d*.

(*b*) F.-w. inner marginal spot absent or only faintly developed . . . *comorarum*. (545)

F.-w. with a well-marked inner-marginal spot, sometimes confluent with spots in 2 and 3.	*c.*	
(*c*) Expanse about 50 mm., h.-w. discal band only about 3 mm. wide, distally edentate	*dumetorum.*	(543)
Expanse about 35 mm., h.-w. discal band about 5 mm. wide, distally regular .	*mayottensis.*	(545)
(*d*) Discal yellow band broad (4–5 mm.) quite or nearly continuous from inner margin of h.-w. to f.-w. area 3, its proximal margin almost a straight line.	*e.*	
Yellow band narrower (2–3 mm.) and having a curved proximal outline from inner margin of h.-w. to f.-w. area 3.	*f.*	
(*e*) F.-w. band continuous from inner margin to area 3	*ochracea.*	(554)
F.-w. band interrupted by ground-colour in anterior half of 1*b* . .	*ochracea ochreata.*	(554)
(*f*) H.-w. band nearer to base than to hind-margin, short and pale ochreous .	*woodwardi.*	(553)
H.-w. band nearer to hind-margin than to base, long and deep yellow . .	*frobenia.*	(542)
(*g*) Base of h.-w. beneath practically unicolorous with rest of ground-colour (generally red-brown) not striped or spotted.	*h.*	
Base of h.-w. beneath striped or spotted.	*m.*	
(*h*) White spots within f.-w. cell.	*i.*	
No white spots in cell.	*j.*	
(*i*) On h.-w. underside a small white spot in area 6	*neavei.*	(556)
No white spot in area 6 . . .	*swynnertoni.**	(556)
(*j*) Underside ground-colour red-brown or orange-brown.	*k.*	
Underside ground-colour ochreous .	*exalenca exalenca.*	(555)
(*k*) H.-w. underside without heavily marked dark internervular rays . . .	*incongrua incongrua.*	(552)
H.-w. underside with heavily marked dark internervular rays.	*l.*	

* This is the principal difference between typical *neavei* and *swynnertoni*, and it is not a constant one. Nevertheless, the male armatures differ. (See under descriptions.)

(*l*) F.-w. with three or four minute white dots beyond cell. h.-w. white band about 2 mm. wide	*incongrua occidentalis.*	(553)
F.-w. without such minute dots, h.-w. band about 5 mm. wide . . .	*exalenca suffusa.*	(556)
(*m*) Base of h.-w. beneath irregularly marked and spotted not with regular pale bands on a dark ground.	*n.*	
Base of h.-w. beneath with curved bands of white or whitish on a dark ground	*r.*	
(*n*) F.-w. cell nearly all white.	*o.*	
F.-w. cell dark or only with white dots .	*p.*	
(*o*) H.-w. discal band only about 3 mm. wide	*metella.*	(548)
H.-w. discal band about 5 mm. wide .	*metella* f. *gratilla.*	(549)
(*p*) F.-w. subapical spots in 5 and 6 not separated by ground-colour . .	*nemetes* f. *carpenteri.*	(551)
F.-w. ditto separated by ground-colour, at least proximally.	*q.*	
(*q*) H.-w. discal band about 5 mm. wide and not markedly projecting outwards in area 5	*saclava.*	(546)
H.-w. ditto about 3 mm. wide and with prominent discal projection in area 5	*saclava* f. *marpessa.*	(547)
(*r*) F.-w. cell dark above like ground-colour, or with only minute white dots, not with sharply defined streaks or spots (*trigonophora* sometimes has a diffused white streak in f.-w. cell above).	*s.*	
F.-w. cell contains more or less white, at least some part of which is sharply defined.	*h'.*	
(*s*) F.-w. discal band practically continuous from nervure 2 to, or nearly to, costa (nervule 4 may be rather blacker than the rest, but see footnote on *seldrayersi*, p. 539).	*t.*	
F.-w. discal band discontinuous, generally owing to reduction of spot in area 4.	*a'.*	
(*t*) F.-w. cell on upperside has white dots.	*u.*	
Ditto rarely with faint paler markings, but not in the form of dots.	*w.*	

(*u*) F.-w. delicate submarginal lines are continuous, interrupted only by the nervules.	*v.*	
These lines less distinct between nervules 3 and 4	*agatha.*	(558)
	*jordani.**	(560)
(*v*) H.-w. discal band extends beyond nervule 6	*seeldrayersi.*†	
H.-w. ditto does not extend beyond nervule 6	*livingstonei.*	(561)
(*w*) Proximal edge of f.-w. discal band straight.	*x.*	
Ditto concave or indented.	*z.*	
(*x*) F.-w. discal band sharply defined, the nervures only very faintly marked.	*y.*	
Discal band formed of elongated white spots rounded and deeply indented distally between nervules . .	*nysiades* (part).	(584)
(*y*) F.-w. discal band almost pyriform and pointed at costal end. Submarginal lines on both wings markedly white .	*nina.*	(580)
Ditto narrower towards costa, but not pyriform. Submarginal lines not so markedly white	*puella.*	(579)
(*z*) F.-w. band somewhat indented distally by ground-colour, especially in 3 and 4, band composed of spots of nearly equal length . . .	*nysiades* f. *continuata.*	(584)
Ditto with the spot in 2 very small and only touching that in 3 at its inner anterior angle	*nysiades* f. *metanira.*	(584)
Ditto with spots in 4, 5, and 6 considerably longer than those in 2 and 3 .	*nysiades* f. *conspicua.*	(584)
	nicomedes f. *puelloides.*‡	(579)

* No absolutely constant character can be given to distinguish these two species; *jordani* is smaller than the average size of *agatha*, and the ground-colour is paler. In *jordani* the discal band is more consistently narrowed towards the costa.

† Occasional examples of *seeldrayersi* have the f.-w. band separated into elongated spots by an increased blackening of the nervules. Such examples are distinguished from *nysiades* by the white dots in f.-w. cell above.

‡ *Puelloides* can generally be distinguished from *conspicua* by its smaller size and the interruption of the f.-w. submarginal lines in area 3 and often in 6.

(*a'*) F.-w. band does not reach costa, only just extending as a narrow longitudinal streak beyond nervule 6 .	*nysiades* f. *clarei*.	(584)
F.-w. band reaches costa or at least into area 8.	*b'*.	
(*b'*) F.-w. cell distinctly dotted with white.	*c'*.	
F.-w. cell dark, though rarely with vestiges of an ill-defined streak.	*c'*.	
(*c'*) White band of both wings very broad (6–10 mm.) and continuous from h.-w. inner margin to nervule 4 of f.-w. .	*kikideli*.	(569)
White band not so broad and distinctly interrupted in area 1*b*.	*d'*.	
(*d'*) The fine line just beyond the discal band is almost straight between the nervules	*rogersi*.	(568)
This line is well arched (proximally concave) between the nervules, especially in 2, 3, and 4	*barnsi*.*	(567)
(*e'*) On h.-w. underside distal to white band a row of large more or less rounded dark spots on a lighter ground-colour.	*f'*.	
Without such spots.	*g'*.	
(*f'*) H.-w. beneath with conspicuous costal white band extending from base to about middle of costa . . .	*poultoni*.	(551)
H.-w. beneath with such band if visible at all very short and not extending along costa	*nemeles nemeles*.	(549)
(*g'*) In f.-w. cell beneath is an elongated curved clavate spot followed by two to four very small spots beyond cell .	*trigonophora*.	(570)
F.-w. beneath with an irregular narrow white mark along costal edge of cell and a transverse streak across end of cell	*nysiades* (part).	(584)
(*h'*) On h.-w. upperside the innermost of the three white submarginal lines is widened so as to form a conspicuous white band at least 2 mm. wide.	*i'*.	

* Strand's *nysiades urungensis* appears to come here, but there is no figure of it and the description is not sufficiently detailed to decide on its exact position. It may even turn out to be one of the above two species.

This line at most only slightly wider than the others, not more than 1 mm.	*k'*.	
(*i'*) A narrow but continuous longitudinal white stripe in f.-w. cell, but no transverse stripe	*rothschildi*.	(574)
A transverse white stripe across end of f.-w. cell.	*j'*.	
(*j'*) F.-w. cell with a longitudinal white stripe	*paula*.	(574)
Ditto with three transverse marks progressively smaller proximally . .	*biafra*.	(571)
(*k'*) Discal band of f.-w. continuous from area 2 to, or nearly to costa, or only just interrupted by nervule 4.	*l'*.	
F.-w. band markedly interrupted at nervule 4.	*m'*.	
(*l'*) In f.-w., proximal edge of spots in 2 and 3 forms a straight line at or nearly at right angles to the long axis of spot in 4	*nicomedes quintilla*.	(579)
This proximal edge is S-shaped without a sharp angle	*nicomedes nicomedes*.	(578)
(*m'*) White marks in f.-w. cell are transverse and usually three in number. (When very faintly developed=*nysiades* typical)	*nysiades* (part).	(584)
White stripe in cell longitudinal.	*n'*.	
(*n'*) In f.-w. cell a white wedge-shaped mark followed distally by a contiguous triangular patch of greyish white scales	*jamesoni*.	(563)
Without such greyish patch (rarely with a few grey scales).	*o'*.	
(*o'*) Discal spot in area 4 of f.-w. is a mere narrow line touching nervule 5, such line nearly as long as the spot in 5	*nicoteles*.	(576)
F.-w. discal spot in area 4 not of this form.	*p'*	
(*p'*) F.-w. spot in 4 well-developed and at least as long as that in 5 . .	*strigata*.	(582)
This spot, if present at all, very small and isolated.	*q'*.	

(*q'*) The white streak in f.-w. cell is long and narrow and just above the origin of nervule 3 is sharply indented anteriorly but not quite divided by the ground-colour. Beneath, this indentation usually contains a white dot	*nebrodes.*	(562)
F.-w. cell streak otherwise formed.	*r'.*	
(*r'*) F.-w. discal spots in 2 and 3 and in 5, 6, and 7 are not notably separated and so form two conspicuous white patches, very little white in cell .	*melicerta* f. *goochi.*	(581)
F.-w. discal spots divided by more or less complete invasions of the ground-colour.	*s'.*	
(*s'*) F.-w. discal spots 5 and 6 very short, almost rounded. Inner marginal spot obsolescent	*nicobule.*	(577)
F.-w. discal spots 5 and 6 elongated, inner marginal spot or spots well developed.	*t'.*	
(*t'*) White mark in f.-w. cell beneath followed distally by a curved white line parallel with its distal outline .	*lermanni.*	(564)
Without such line.	*u'.*	
(*u'*) A well-developed triangular spot just distal to f.-w. cell stripe . . .	*melicerta.*	(580)
Without such triangular spot . .	*mixophyes.*	(576)
	*nicodice.**	(577)

1. Neptis frobenia. Pl. XX, fig. 1; Pl. XXIV, fig. 1.

Fabr., Ent. Syst. Suppl., p. 425 (1798); God., Enc. Meth., 9, p. 130 (1823); Boisd., Faune Mad., p. 51 (1833); Trim., Trans. Ent. Soc. Lond., p. 335 (1866); Mab., Hist. Mad. Lep., 1, p. 170, pl. 20, f. 5, 6 (1885–7); Auriv., Rhop. Aeth., p. 166 (1898); in Seitz, Macrolep., p. 199, pl. 48*c* (1913).

* I can find nothing in the description of *nicodice* to distinguish it from *mixophyes* except its size. The former is said to have an expanse of 48 mm. and the latter 32 mm. Size is of little value in the genus. I have before me examples of *agatha* varying 20 mm. in expanse.

Mauritius.

Expanse about 38 mm. Ground-colour uniform umber brown. On f.-w. a narrow hind-marginal border very slightly paler followed inwardly by a second and sometimes a third slightly paler line. On inner margin near angle a small, not always well-defined spot of deep yellow, traversed by nervule 1. In areas 2 and 3 deep yellow spots forming a large ovate discal mark, its long axis nearly at right angles to costa. Three subapical spots of deep yellow forming a rather irregular mark in 5, 6, and 8, the middle spot the largest and that in 8 the smallest. On h.-w. a discal band of deep yellow almost pointed at anal angle, but widened gradually to nervule 4, thence somewhat narrower, and barely reaching the costa, its proximal edge nearly straight, its distal tending to concavities between the nervules. Marginal and submarginal narrow borders somewhat paler than ground-colour.

Underside. Paler and duller ground-colour. In f.-w. a trace of a white line across end of cell. In h.-w. the discal band white or faintly pinkish, sharply defined proximally, but distally shaded into ground-colour and followed by two pale zigzag lines whose angles lie on and between the nervules. In the male there is a silky opalescent area on inner margin of f.-w. extending to nervule 2.

Neptis frobenia is not very common in collections. It is easily identified and has a very different appearance from that of any other species. The male clasper is very like that of *comorarum*. Owing to lack of material I am unable to say whether the small differences shown in the drawing are constantly recognisable. Aurivillius gives Madagascar as a locality for this species, but there appears to be no record of its occurrence on that island.

2. Neptis dumetorum. Pl. XX, fig. 2; Pl. XXIV, fig. 2.

Boisd., Faune Mad., p. 50, pl. 7, f. 6 (1833); Mab., Hist. Mad. Lep., 1, p. 169, pl. 20, f. 3, 4 (1885–7); Oberth., Etud. d'Ent., 13, p. 14 (1890); Metamorph., Oberth., *l. c.* 12, p. 14, pl. 4, f. 2*c*, 2*d* (1888); Auriv., Rhop. Aeth., p. 166 (1898); Poulton, Proc. Ent. Soc. Lond., p. xxxiii (1908); Auriv., in Seitz, Macrolep., p. 199 (1913).

Bourbon.

Expanse about 45 mm. Ground-colour dark umber. Paler markings deep yellow. F.-w. with three minute white dots in cell

and three, sometimes four beyond it. A submarginal border consisting of two lines faintly darker than ground-colour, between which are developed minute white dots especially towards the apex. A small hind-marginal spot of deep yellow followed by a large discal spot in 2 and 3, more quadrate than in *frobenia*. A subapical spot made up of patches of nearly equal length in 5, 6, and 8. H.-w. with traces of a hind-marginal border of lighter and darker markings and with a discal band of deep yellow of sharply defined but irregular outline, not more than about 3 mm. wide at its broadest part, deeply concave between the nervules from 1*b* to 4 and projecting suddenly outwards in area 4.

Underside more or less reproducing the pattern of upperside, but ground-colour much paler and f.-w. hind-marginal and subapical spots nearly white, also a whitish transverse mark across end of cell. Hind-wing base with faint indications of pale spots, a curved row of small whitish spots in 4, 5, 6, and 7, followed by the discal band which is white or pinkish, sharply defined on both edges, and distally edged with dark brown followed by a greyish line. Slight indications of a double submarginal row of pale spots. Male with a pearly opalescent area in f.-w. extending from inner margin beyond nervule 2.

The following description of the larva is from Oberthür.

Originally fed on *Trajia reticulata*, but now feeds on *Acalypha marginata*, plants introduced from Mauritius. Larva pale chestnut. Flexed, about 22 mm. long. Six lateral membranous protuberances; the intermediate ones longer and projecting forward like horns. Three sublateral festoons edged with white and above the angle of the festoon white oblique marks. The last festoon rises posteriorly towards the caudal extremity, which ends in four fine points. Underside rose brown. The last segment has a pale shining mark of "arabesque" form. A paler median dorsal line arises from the prothorax and ends well before the caudal extremity.

The chrysalis is angular, short, flattened laterally, and projecting at the alar extremities. Gold pink tending to yellow or cream, opalescent. All the dorsal projections end in green points with a green iridescence. The prominent abdominal lines are touched with gold. The abdominal segments have a gold reflection.

Alleged occurrences of this species elsewhere than in the island of Bourbon seem unreliable. The male clasper resembles that of *comorarum*, but presents small differences which will be noted in the figure.

3. Neptis mayottensis. Pl. XX, fig. 3; Pl. XXIV, fig. 3.

Oberth., Etud. d'Ent., 13, p. 14, pl. 2, f. 10*a*, 10*b* (1890); Auriv., Rhop. Aeth., p. 166 (1898); Poulton, Proc. Ent. Soc. Lond., p. xxxv (1908); Auriv., in Seitz, Macrolep., p. 199, pl. 48*c* (1913).

Mayotte I.

Expanse about 35 mm. Ground-colour dark umber. F.-w. with three white dots in cell and three beyond. A submarginal border of two very slightly darker lines with paler marks between them which are resolved into distinct white dots towards the apex. A deep yellow inner-marginal patch in 1*a* and 1*b* continuous with the h.-w. discal band. A large patch of deep yellow in 2 and 3, and three subapical spots of same colour in 5, 6, and 8, the last very small. H.-w. with a broad dark yellow discal band 4 mm. wide and of regular outline. A submarginal border of two lines darker than ground-colour, the inner line twice the width of the outer.

Underside. Ground-colour paler. F.-w. large spots only slightly yellow, and the white dots accentuated. There are also two yellowish marks in cell and a transverse one at end of same. Traces of a second submarginal series of white dots beyond those which are also visible above. H.-w. irregularly marked in basal area with ill-defined whitish and yellowish spots, the discal band pinkish white and the space between it and hind margin occupied by a border consisting of internervular patches of dark brown shaded to reddish, each patch bounded proximally by a curved, and distally by a straight whitish line. Between the latter and margin a third very fine white line. The male has a pearly opalescent area in f.-w. reaching to nervule 2.

The female is paler and all the white dots more accentuated on both surfaces, so that on the upperside there is a complete submarginal series of these. In the h.-w. the discal band is broader. The male clasper except for its smaller size is very like that of *dumetorum*.

4. Neptis comorarum. Pl. XX, fig. 4; Pl. XXIV, fig. 4.

Oberth., Etud. d'Ent., 13, p. 14, pl. 2, f. 9*a*, 9*b* (1890); Auriv., Rhop. Aeth., p. 166 (1898); Poulton, Proc. Ent. Soc. Lond., p. xxxv (1908); Auriv., in Seitz, Macrolep., p. 199, pl. 48*a* (1913).

Grand Comoro.

comorarum leighi.

Roth., Novit. Zool., p. 341 (1918).

Anjouan I.

comorarum comorarum.

Expanse 35–45 mm. On the upperside this species resembles *mayottensis* with the exception that the f.-w. inner-marginal spot is nearly always absent, though out of some twenty-four examples before me, three or four have a slight trace of it.

The underside is also very similar, but in the male the f.-w. opalescent area extends well into area 2, while the space between the discal and subapical spots is reddish brown. There is also more reddish brown on h.-w., especially near costa.

comorarum leighi.

Differs from the type form in being smaller, the orange spots above paler, and the markings below less sharp and distinct.

The male clasper of the type form differs from that of its immediate allies in the greater development of the upper projection.

5. Neptis saclava. Pl. XXIV, fig. 5.

Boisd., Faune Mad., p. 49 (1833); Lucas in Chenu, Enc. H. N. Pap., p. 132, f. 248 (1853); Trimen, Rhop. Afr. Austr., p. 148, 338 (1862–66); Mab., Hist. Mad. Lep., 1, p. 173, pl. 20, f. 7, 8 (1885); Auriv., Rhop. Aeth., p. 166 (1898); Poulton, Proc. Ent. Soc. Lond., p. xxxv (1908); Auriv., in Seitz, Macrolep., p. 199, pl. 48*c* (1913).

Madagascar.

saclava marpessa. Pl. XX, fig. 5.

Hopff., Sitzb. Akad. Wiss. Berlin, p. 640 (1855); Peters, Reise Moss. Ins., p. 383, pl. 24, f. 9, 10 (1862); Trimen, S. Afr. Butt., 1, p. 272 (1887); Butl., Proc. Zool. Soc. Lond., p. 65 (1888); Auriv., Rhop. Aeth., p. 167 (1898); Butl., Proc. Zool. Soc. Lond., p. 921 (1900); Roth. & Jord., Novit. Zool., p. 536 (1903); Poulton, Proc. Ent. Soc. Lond., p. xxxv (1908); Rogers, Trans. Ent. Soc. Lond., p. 505 (1908); Neave, Proc. Zool. Soc., p. 33 (1910); Auriv., in

Seitz, *l. c.* (1913); Holl., Bull. Am. Mus. Nat. Hist., p. 160 (1920).

= *nemetes* var. *pasteuri*. Snellen, Tijdschr. Ent., xxv, p. 221 (1882).

Africa south of Sahara.

saclava saclava.

Expanse about 45 mm. Ground-colour dark sepia. Three white dots in cell and three or four beyond it. An inner marginal spot in 1*a* and 1*b* which may or may not be contiguous with a large white patch in 2 and 3. In area 4*a* a small distally placed white dot followed anteriorly by three white spots in 5, 6, and 8. These are separated from each other by the ground-colour, especially the first two, and the third on the costa is very small. The hind-marginal border consists of two fine whitish lines and sometimes a third close to the larger white marks, much interrupted at the nervules and broken into small spots. Between these and the large discal spots is a row of darker internervular markings sometimes tipped with white scales proximally. On h.-w. a broad white discal band about 4–5 mm. wide of fairly even outline but slightly, though not very markedly, projecting in area 5. Following the discal band there is a row of rather large more or less rounded dark internervular markings, followed again by two lines of equally dark but much narrower marks.

Underside. The white markings are repeated but in f.-w. the subapical patch is continued right to the costa by the addition of linear marks in areas 9 and 10, and these marks are lemon yellow. The ground-colour is variable and blotchy, reddish in cell and along the nervures, darker above central patch to costa, and at apex and between nervules 3 and 4. Externally adjacent to white markings is a row of dark spots, interrupted in area 5. On h.-w. the base is brownish with irregular pale marks. Distal to the discal band a row of dark internervular spots, proximally edged with white, of which those in 3 and 4 are largest. Beyond these, two rows of transverse internervular dark markings, also edged with white.

Male beneath has a pearly inner marginal area in f.-w. extending to nervule 2. The female also has a similar area, but of much smaller extent and generally hidden in average setting.

saclava marpessa.

This is the mainland form and is generally supposed to be distinguished by its narrower white markings, but I have before me W. African examples with the h.-w. discal

band broader than in the majority of those from Madagascar. The most constant difference between the mainland and the island forms is the marked projection in the former of the h.-w. discal band in area 5.

Saclava is unlikely to be confused with any other species except *nemetes*, but in the latter the subapical spots are coalescent, and the h.-w. discal band is continuous with the f.-w. white markings right up to nervule 4 of f.-w., at least on the proximal side. The male clasper of *saclava* is of the same type as in the yellow marked Madagascar species, though its upper projection is less highly developed. All these species are undoubtedly closely related. An interesting discussion by Prof. Poulton on the forms will be found in Proc. Ent. Soc. Lond., p. xxxv, 1908.

6. Neptis metella. Pl. XX, fig. 6; Pl. XXIV, fig. 6.

Doubl. & Hew., Gen. Di. Lep., p. 272, pl. 35, f. 2 (1850); Holl., Ent. News, 3, pl. 9, f. 3 (1892); Auriv., Rhop. Aeth., p. 166 (1898); Poulton, Proc. Ent. Soc. Lond., p. xl (1908); Auriv., in Seitz, Macrolep., p. 199, pl. 48*c* (1913); Holl., Bull. Am. Mus. Nat. Hist., p. 160 (1920).

S. Leone to V. Nyanza.

metella gratilla.

Mab., Ann. Ent. Belg., 23 Bull., p. 106 (1880); Hist. Mad. Lep., 1, p. 172, pl. 18*a*, f. 7 (1885–7); Auriv., Rhop. Aeth., p. 166 (1898); in Seitz, Macrolep., p. 200 (1913).

Madagascar.

metella metella.

Expanse about 45 mm. Ground-colour dark sepia. Markings white. In f.-w. cell a long prominent streak pointed at base, widest at cell end, projecting beyond, and again reduced to a point. In a few examples this streak is obsolescent. In most specimens there are two small marks just above outer point of cell streak. A small inner-marginal spot of variable size in 1*a* and 1*b*. Two large discal spots in 2 and 3 notably separated by nervule 3. In 4 two small spots, larger ones in 5 and 6, and a very small one in 8. Just distal to spots in 2 and 3, and 5 and 6, a white transverse line, variable and sometimes obsolescent. A hind-marginal border of two white lines variable and generally interrupted in 3.

H.-w. with a broad white discal band followed by dark interner-

vular markings, followed again by two pale lines variable and sometimes white.

On underside the f.-w. is deep yellow at base and for some distance along the costa, the ground-colour pale sepia brown and the white markings of the upperside are repeated but more distinctly. An irregular row of blackish spots beyond the discal white markings. The submarginal white lines, of which there are three, are thickened, and separated only by dark internervular streaks, though more or less completely interrupted in area 3.

H.-w. base yellowish with black spots. The discal band bordered by small internervular black spots followed by a row of larger rounded ones on a yellowish ground, followed again by two narrow black lines on a pale ground.

The male has an inner-marginal pearly white area on f.-w. extending to nervule 2.

metella gratilla.

The Madagascar form seems only to be distinguished by larger white markings, but examples before me from near Lagos are equally remarkable in this respect.

If the numbers received in general collections are of any proportional value *metella* would seem to be comparatively rare. The species cannot well be mistaken for any other with its combination of white streaked cell and h.-w. base beneath yellowish, spotted with black.

If we assume the structure of the male armature to be of value in estimating affinities, all the foregoing species would be regarded as closely allied members of an intergeneric group. They are more easily recognised by their outward characteristics than by the genitalia, which, though all very distinct from those of the rest of the genus, present but small constant differences *inter se*.

7. Neptis nemetes. Pl. XX, fig. 7.

Hew., Exot. Butt., Neptis, pl. 1, f. 1, 2 (1868); Holl., Ent. News, 3, pl. 9, f. 4 (1892); Karsch, Berl. Ent. Zeit., 38, p. 186 (1893); Auriv., Rhop. Aeth., p. 167 (1898); Neave, Proc. Zool. Soc. Lond., p. 33 (1910); Auriv., in Seitz, Macrolep., p. 200, pl. 48*c* (1913); Holl., Bull. Am. Mus. Nat. Hist., 160 (1920).

S. Leone to Uganda.

nemetes obtusa.

Roth. & Jord., Novit. Zool., p. 536 (1903).

Scheko.

nemetes f. *carpenteri*, f. nov. Pl. XXIV, fig. 7.

Kakindu (W. of V. Nyanza). Semliki Valley. Uganda.

nemetes nemetes.

Expanse 40–45 mm. Sepia black with white markings. F.-w. with a white patch beginning at the inner margin and ending at nervule 4. The four spots constituting this patch are somewhat variable. In some forty examples before me they are always contiguous at least on the proximal side, and their inner edge forms a somewhat concave line continuous with the proximal edge of the h.-w. discal band. The spots in 2 and 3 project distally beyond those in 1*a* and 1*b*. In area 4 there is usually a small spot placed distally, and this is followed by a subapical white patch formed of three contiguous spots in 5, 6, and 9. In many examples there is an irregular, somewhat broken white line about 1·5 mm. from the other white markings and roughly following their outline. Beyond this are two, sometimes three delicate pale lines interrupted at the nervules and in area 3 and at apex. Fringes rather notably white between nervules except in 3 and 6.

H.-w. with a white discal band varying from 3 to 5 mm. in width. Beyond this band a row of rounded internervular spots rather darker than the ground-colour, followed by three pale lines which are in some specimens quite white and distinct. Fringes markedly white between the nervules.

Beneath, ground-colour pale. Costa white at base. In cell a white line running along subcostal nervure and curving over to form a transverse boundary at end of cell. Just beyond this boundary a second fine pale line, and beyond that a third. On median side of cell a short broken line. White patches as on upperside. White lines much more distinct, and irregular dark spots between discal patches and submarginal border lines.

H.-w. base brown with three transverse white lines, the first basal and continuous with subcostal line of f.-w. cell, the second broader and almost continuous with the median line of f.-w. cell, and the third narrow and hardly reaching the costa. Discal white band as above followed by a pale yellowish-brown line on ground-colour and a band of dark well-rounded internervular spots, which are shaded away outwardly, to be followed by a rather broad white line and two narrow ones, all divided by the nervules. Dark spots at nervule ends.

nemetes obtusa.

Messrs. Rothschild and Jordan's description of this form is as follows :—

Costal margin of f.-w. shorter than in *nemetes nemetes*, the wing appearing more obtuse. The white band in both wings much narrower, the inner edge of the band of the h.-w. crossing vein M just at point of origin of M1. Length of f.-w. 21 mm.

nemetes f. **carpenteri.**

There is no quite constant difference between the upper-side of this form and that of *nemetes nemetes*, though in the latter the f.-w. spots in 2 and 3 tend to be longer. Beneath, the ground-colour and all the light markings, except the large white bands and spots, are more yellowish, thus bringing the dark rounded spots into greater prominence. The principal difference, however, is in the base of h.-w. cell beneath, which is not banded with white, but is of a yellowish ground-colour with more or less well-defined black spots.

There is no recognisable difference between the armatures of the typical form and f. *carpenteri*.

Except for the variability of the width and extent of the white markings *nemetes* is a fairly constant and easily recognised species. The only species likely to be confused with it is *N. poultoni*, which, however, can at once be distinguished by the conspicuous curved white costal band at base of h.-w. beneath. The form *carpenteri* seems to be the only one at Kakindu. Wherever it occurs it appears to be accompanied by *metella*, a fact which suggests a mimetic approach to that species in the pattern of h.-w. base beneath.

8. Neptis poultoni. Pl. XX, fig. 8; Pl. XXV, figs. 7, 8.

Eltr., Ent. Mo. Mag., Ser. 3, vol. vii, p. 26 (1921).

Uganda (Chagwe, Mabira Forest).

" Expanse 38–42 mm. Ground-colour dark sepia, with white discal markings. F.-w. with an inner marginal patch in 1*a* and 1*b* the proximal edge of which forms a straight line continuous with that of the h.-w. discal band. In 2 and 3 are large contiguous spots forming a subovate patch of regular outline. In area 4 a minute white dot placed distally. In 5, 6, and 10 contiguous spots forming a large subapical patch. Distal to the white markings and roughly following their contour a line somewhat paler than ground-colour, followed by

a band of more or less rounded dark internervular spots, this followed again by three paler lines forming the hind-marginal border. Fringes dotted white between nervules.

H.-w. with a white discal band of regular outline 4 mm. wide on inner margin, and rather broader in 5, thence narrowing to a small spot in 7. Distal to the white band a border similar to that in f.-w.

Underside. Ground-colour paler than above. Costa white at base and as far as cell end. In cell a white line on subcostal curving downwards and outwards, its end pointing to origin of nervule 3. On end of cell a white transverse line, and beyond this, indications of a second indistinct line. Discal white spots as above, but subapical extends into 10. The border arrangement of pale lines much accentuated owing to increased whiteness of lines and an additional fine marginal line.

H.-w. brown at base, but with a *conspicuous curved white costal bar from base to end of* 8, followed by two indistinct narrow whitish streaks on dark ground. Beyond discal band border of same pattern as in f.-w."

Neptis poultoni closely resembles *nemetes nemetes* Hew. and also, even more closely, *trigonophora* Butl. From *nemetes* it is at once distinguished by the curved white costal band in h.-w. underside, and from *trigonophora* by the underside pattern of the hind margins of both wings. The male armature is unlike that of any other species I have examined. In the note to my original description (*l. c.*) the word "costal" was unfortunately misprinted "distal."

9. Neptis incongrua. Pl. XX, fig. 9; Pl. XXIV, fig. 8.

Butl., Proc. Zool. Soc., p. 112, pl. 6, f. 2 (1896); *l. c.* (1896), p. 826 (1897); Auriv., Rhop. Aeth., p. 169 (1898); Auriv., Sjostedt Exp. Kilimandjaro, p. 6 (1910); Auriv., in Seitz, Macrolep., p. 203, pl. 48*f* (1913).

Dabida Hills. Mombasa. Kikuyu. Taita. Nyassaland. Tanganyika Ter. Lindi.

incongrua occidentalis.

Roth., Novit. Zool., p. 342 (1918).

90 km. W. of L. Albert Edward.

incongrua incongrua.

Expanse about 50 mm. Sepia black with white markings. F.-w. with two small hind-marginal spots in 1*a* and 1*b* separated by the nervure. Two spots in 2 and 3, the upper one the smaller. A subapical row of three spots, the first in 5, rounded, the second in

6, subquadrate, the third in 8, very small. Three small dots beyond cell. (One example in the Hope Dept. has an additional discal spot in area 4.)

H.-w. with a discal band of white spots about 3 mm. wide at broadest part extending from inner margin to area 6, the spots progressively more separated, that in 6 being small and rounded. Fringes of both wings white between nervules.

Underside chestnut brown. F.-w. without spots in cell, but with three small dots beyond it. Spots as on upperside but less separated, the two upper spots of subapical row fused together with an additional streak in 9. In male a pearly inner marginal area extending to nervule 2.

H.-w. with discal band as above, but more continuous and edged with sepia. Extreme margins and all nervures especially in h.-w. black. No internervular rays.

incongrua occidentalis.

Ground-colour greyer than in the type form. All the spots of f.-w. discal band wanting except those on each side of 1, 3, and 6, and these are much smaller. H.-w. band narrower. Both above and below there are dark internervular rays. Beneath the disc of f.-w. and outer fifth of h.-w. much deeper rufous.

Neptis incongrua is quite unlike any other species except *swynnertoni*, from which it differs in having smaller white marks and no spots in f.-w. cell.

I have examined the type of *incongrua occidentalis*, and though the great reduction of the white spots gives it a characteristic appearance, the male armature seems to resemble that of the type form within the limits of individual variation.

10. Neptis woodwardi. Pl. XX, fig. 10; Pl. XXIV, fig. 9.

Sharpe, Ann. Nat. Hist., (7) III, p. 243 (1899); Poulton, Trans. Ent. Soc., p. 512, pl. xxix, ff. 1, 2, 3, 4 (1908); Auriv., in Seitz, Macrolep., p. 203 (1913).

Uganda.

Expanse about 45 mm. Sepia brown with yellow and white markings. F.-w. with two spots in 2 and 3 which may be ochre yellow or white, and small subapical spots in 5, 6, and 8, the last very small. These are generally white.

H.-w. with a discal band of ochre yellow 3–4 mm. wide, rarely white, beginning just below nervule 2 and ending in 6. Fringes of both wings white between nervules.

Underside ochreous, brownish over central area in f.-w. and near apex of h.-w. Spots of f.-w. as above, but white and with an additional streak in 9. H.-w. discal band as above, sharply defined. In both wings fine dark internervular rays which are also visible above.

The colour of the lighter markings in this species is extremely variable. In some examples they are all white, but this appears to be due to fading. It is easily distinguished from all other species in so far as pattern is concerned, though the male clasper is doubtfully distinguishable from that of *ochracea*.

As Prof. Poulton has pointed out (*l. c. supra*) examples from E. of the Rift Valley show a greater mimetic approach towards *Amauris*, than specimens from more westward localities. The figures quoted should be referred to on this interesting point.

11. Neptis ochracea. Pl. XX, fig. 11; Pl. XXIV, fig. 10.

Neave, Novit. Zool., 11, p. 330, pl. 1, f. 5 (1904); Auriv., in Seitz, Macrolep., p. 203 (1913).

Toro. Entebbe. Kakindu.

ochracea f. *ochreata*.

Gaede, Int. Ent. Zeit. Guben, 9, p. 38 (1915).

= *exaleuca* var. *ochracea*. Grünb., Ergeb. Deut. Cent. Af. Exp. F. von Mecklenberg, 1907–8 (1912).

= *ochracea parvimacula*. Roth., Novit. Zool., p. 341 (1918).

Kwidgwi (L. Kivu).

ochracea f. *milbraedi*.

Gaede, *l. c.*, 9, p. 38, pl. 1, f. 3 (1915).

N. Cameroon.

ochracea ochracea.

Expanse 40–50 mm. Ground-colour dark to medium sepia brown with orange to pale ochreous areas. F.-w. with a broad patch of ochreous from inner margin to area 3, and a subapical patch of two subquadrate spots of the same colour in 5 and 6, sometimes followed by a small spot near costa. H.-w. with a broad ochreous discal band reaching to origin of 2, its proximal edge forming a continuous but not very regular line with that of the f.-w. inner marginal patch. Nervules and rays dark.

Underside pale dull ochreous, rather darker over basal half of f.-w. Paler marks as above, but h.-w. discal band reaches practically to base and is ill defined distally except in very dark specimens. Nervules and internervular rays well marked.

ochracea f. **ochreata.**

Differs from the type form in having the yellow bands narrower and the f.-w. discal band is interrupted in 1*b*. I have examined an example of the armature of Lord Rothschild's *parvimacula* and it is the same as that of *ochracea*. I cannot discover any difference in outward characters between forms *ochreata* and *parvimacula*, and both are described from the same locality.

f. **milbraedi.**

Differs from the type form in having the yellow bands rather broader and the costal spot wanting in f.-w. This latter point is no real distinction, as otherwise typical forms are without the spot.

The resemblance of *ochracea* to *exaleuca* in all but colour is very remarkable, and it is tempting to regard them as forms of the same species; nevertheless, although the armature of *exaleuca* is variable, I have not found an example approaching agreement with that of *exaleuca*.

12. Neptis exaleuca. Pl. XX, fig. 12; Pl. XXIV, fig. 11.

Karsch, Berl. Ent. Zeit., 39, p. 9, f. 5 (1894); Auriv., Rhop. Aeth., p. 169 (1898); Auriv., in Seitz, Macrolep., p. 202 (1913); Holl. (*Neptidomima*), Bull. Mus. Am. Nat. Hist., p. 164 (1920).

Cameroon. Congo.

exaleuca suffusa.

Roth., Novit. Zool., p. 341 (1918).

95 km. W. of L. Albert Edward (3250 ft.).

exaleuca f. *integra*, f. nov.

Toro.

exaleuca exaleuca.

Expanse 45–50 mm. Ground-colour dark sepia with white markings. The description of the upperside of *ochracea* applies to this species if we substitute white for ochreous patches, and add that there is a break in the inner-marginal patch in area 1*b*. The

pale marks are somewhat smaller than in *ochracea* and distally more sharply defined. Beneath, the ground-colour is pale sepia, but the base of both wings is orange ochreous, and the h.-w. band is very sharply defined, being bounded distally, especially as far as 3, by a fine line darker than the ground-colour.

exaleuca suffusa.

Ground-colour is much darker and the f.-w. patches on each side of 1 and 3 much smaller. The underside is strongly marked with rufous orange.

The male clasper of *exaleuca* is of a very unstable pattern. It differs from that of *ochracea* in the form of the projection on the upperside of the clasper. In *woodwardi*, *ochracea*, and *incongrua* this is extended into a prominent upward and backwardly curved hook. In *exaleuca*, of which I have made several preparations, the hook is very small in one example. In another there is one very small hook on the left clasper and two on the right. In none of my preparations is there any approach to the great development of the hook found in the other species or in *nemetes*. The armature of *exaleuca suffusa* is somewhat intermediate to that of *ochracea* in having a slight development of the upturned hook, but the claspers of *exaleuca suffusa* are not more different from those of *exaleuca exaleuca* than different examples of the latter are from each other.

exaleuca f. **integra.**

Differs from typical *exaleuca* in having no definite interval of ground-colour between spot in f.-w. 1*a* and that in 2. The male clasper is of the same type as those of the typical form.

13. Neptis swynnertoni. Pl. XXI, fig. 1; Pl. XXIV, fig. 12.

Trim., Proc. Ent. Soc. Lond., p. xxviii (1912).

S. E. Rhodesia (Mt. Chirinda).

subsp. *neavei*.

Roth., Novit. Zool., p. 342 (1918).

Nyassaland (Mt. Mlanje).

swynnertoni swynnertoni.

Expanse 40–50 mm. Ground-colour sepia black, with white

markings. F.-w. with three small white spots in cell and four beyond it. A very small inner marginal spot not always extending beyond 1*a*. A large patch of two spots in 2 and 3, its proximal and distal margins forming nearly parallel lines at right angles to the costa. A rounded spot in 5, a subquadrate in 6, and a very small spot in 8.

H.-w. with a discal white band about 5 mm. wide beginning about middle of inner margin and ending, considerably reduced in width, in area 6. All fringes white between nervules.

Underside chestnut brown. White markings as above, but with an extra subapical spot on costa. The h.-w. discal band outlined with darker colour.

The principal distinction between this species and *incongrua* is the presence of white spots in the f.-w. cell, and the large coalescent spots in f.-w. 2 and 3. Whilst the external characters suggest a very close relationship to *incongrua*, the male clasper is so different from that of the other species of the group as to suggest only a very slight affinity. That the clasper of *incongrua* should present a far closer resemblance to that of *nemetes* than to that of *swynnertoni* is a good example of the difficulties presented by this genus.

Trimen (*l. c.*) regards this species together with *incongrua*, *exaleuca*, and *woodwardi* as allied to the Palaearctic species *lucilla* Fab.

swynnertoni neavei.

Whilst the type of this form in Lord Rothschild's collection differs in certain small points from the few examples of *swynnertoni* we have at Oxford, examination of a small series of Mlanje specimens in the national collection shows that such differences are not constant. Perhaps the least inconstant feature is the absence of well-marked internervular rays on the h.-w. underside in *neavei*.

I strongly suspect that when Lord Rothschild described *neavei* he had not seen an example of *swynnertoni*, otherwise he would not have compared it with *exaleuca*, with which it has little in common. Indeed, it is difficult to separate *neavei* from *swynnertoni* on any outward character, but the fact remains that the male armatures are different, at least according to the few preparations I have been able to make from these rare forms.

The clasper of *swynnertoni* is shown at Pl. XXIV, fig. 12. Those of examples from Mlanje (= *neavei*) differ in having an upturned hook at the extremity, somewhat like that of

ochracea, though less developed. My friend Dr. S. A. Neave tells me that the fauna of Chirinda and Mlanje present great similarities, and the explanation of the present case seems a simple one. The same species, *swynnertoni* has become isolated in the two elevated regions. On Mlanje the clasper has developed an upturned hook. Doubtless in course of time other modifications will arise, and what are now probably forms of the same thing will ultimately become two definitely separate species.

14. Neptis agatha. Pl. XXI, fig. 2; Pl. XXIV, fig. 13.

Stoll, Cramer Pap. Exot., 4, p. 76, pl. 327, f. A, B (1780); Hopffer, Peters Reise Moss. Ins., p. 383 (1862); Staud., Exot. Schmett., 1, p. 146, pl. 50 (1885–6); Trim., S. Afr. Butt., 1, p. 270 (1887); Karsch, Berl. Ent. Zeit., 38, p. 186 (1893); Auriv., Rhop. Aeth., p. 167 (1898); Roth. & Jord., Novit. Zool., p. 536 (1903); Rogers, Trans. Ent. Soc. Lond., p. 505 (1908); Neave, Proc. Zool. Soc., p. 33 (text fig.) (1910); Auriv., in Seitz, Macrolep., p. 200, pl. 48*d* (1913); Longstaff, Trans. Ent. Soc. Lond., p. 21 (1913); *l. c.* p. 275 (1916); Holl., Bull. Am. Mus. Nat. Hist., p. 160, pl. vi, ff. 7, 8 (1920).

= *melicerta*. Fab., Syst. Ent., p. 508 (1775); Godt., Enc. Meth., 9, p. 432 (1823); Trim., Rhop. Afr. Aust., p. 146 (1862).

= *agathe*. Herbst, Naturs. Schmett., 9, p. 86, pl. 238, f. 7, 8 (1798).

Africa S. of Sahara.

agatha ab. *lativittata*.

(*N. lativittata*) Strand, Archiv. f. Naturg., 75, 1, p. 305 (1909).

With type form.

agatha agatha.

Expanse 35–50 mm. Sepia black with white markings. F.-w. with three to four or five dots in cell. A hind-marginal patch of two spots in 1*a* and 1*b*, a discal band of spots from 2 to costa, sometimes quite continuous, sometimes interrupted slightly by nervules, the outer edge forming a fairly regular convex curve, the inner straighter but usually indented at nervule 4. Distal to this band a line rather paler than ground-colour and sometimes bearing a few white scales,

this followed by three lines of transverse internervular white streaks interrupted by the nervules and more completely broken (very rarely unbroken) in area 3. Fringes of both wings white between nervules.

H.-w. with a white discal band of variable width, but usually about 5 to 6 mm. extending from middle of inner margin to area 6. Beyond this the ground-colour rather paler, then darker, and finally a submarginal border of three fine white lines, broken only by the nervules.

Underside. Sepia brown. F.-w. white at base of costa, a variable series of spots in cell and two or three beyond it. Discal band as above, but rather broader. The pale line beyond it broader than above, but more diffuse. The white marginal lines much more pronounced, the first expanded into triangular spots near apex. Often a fourth line along hind margin. Interruption in area 3 sometimes complete, sometimes scarcely evident.

H.-w. with a white costal band, followed by two others, the first of which travels well along costa where it is broken into spots. Pale line beyond the discal band often with a slightly ochreous appearance. First (proximal) submarginal line much widened, all more distinct than above, and often a fourth line at margin.

agatha lativittata.

The white markings of more than average extent.

Neptis agatha is by far the commonest and most widely distributed species in the African region. The species with which it is liable to be confused are *jordani*, *livingstonei*, *barnsi*, and *seeldrayersi*. No absolutely constant characters can be given to distinguish *jordani*, but its characteristics so far as they can be described will be found under that species. The form *livingstonei* is unknown to me. The published figure shows the h.-w. discal band extending only to area 5, and this seems to be the principal distinction. The two species *barnsi* and *seeldrayersi* are distinguishable by small features thereunder described. It is unfortunate that the interruption of the f.-w. submarginal lines in area 3 is not an absolutely constant character, some examples referable to the *lativittata* form having practically continuous lines. This condition is, however, rare and the interrupted lines will almost always serve to distinguish *agatha* from the other species named, with the exception of *jordani*, which also has this feature. Holland (*l. c.*) points out that there is generally a difference between

examples taken in woodlands and those from more open country, the latter being smaller and having a broader white band.

For the sake of completeness I should mention here a form provisionally named *urungensis* by Strand (Mitt. Zool. Berl. V, p. 287 (1911)), and placed by Aurivillius as a form of *nysiades* (Macrolep., p. 201 (1913)). Strand mentions (*l. c.*) two examples resembling Neave's *conspicua*, one of which is distinguished from typical *conspicua* in having well-defined white dots in cell on upperside. The remainder of the description is quite useless as a means of identification, and the author states that should it prove to be a definite form he proposes the name *urungensis*. In my opinion this kind of half-description and provisional nomenclature should not be valid as founding a name of any kind. If the example in question has distinct white dots in cell it certainly cannot be a form of *conspicua*. I place it here merely because it suggests, though only vaguely, something allied to *agatha*.

15. Neptis jordani. Pl. XXI, fig. 3; Pl. XXIV, fig. 14.

Neave, Proc. Zool. Soc. Lond., p. 33, pl. 2, f. 1 (and text fig.) (1910); Auriv., in Seitz, Macrolep., p. 200, pl. 48*d* (*agatha* ab.) (1913); (?) Holl., (as *agatha*) Ent. News, pl. 9, f. 2 (1892).

Chishi I. (L. Banguelo). Katanga (Kambove). Boussa (Kassai R.). Aruwimi. Nyassa. Victoria Falls.

A detailed description would follow so closely that of *agatha* that it would seem of more use to state as fully as possible the directions in which it differs from that species. I have before me a series of thirty-six examples. In general appearance the ground-colour is browner than *agatha*. The f.-w. discal band is very complete and shows no blackening at the nervules. In practically every case the white spot in area 4 is longer than that in area 5, whereas in *agatha* 4 is generally shorter than 5. In *jordani* the white in 6 is so markedly shorter than that in 5 that the whole band has a narrowed appearance towards the costa, an effect much less apparent in *agatha*. The distal margin of the discal band from nervule 4 to the costa presents on the whole a straight or even concave line, whereas in *agatha* such margin is convex. In h.-w. the white of the discal band projects outwardly between the nervules, especially in 4 and 5, and the ends of such projections are well rounded. In *agatha* the ends of the

component white spots are generally cut off nearly straight, and they are not liable to so prominent a projection in 4 and 5. This feature is perhaps even more evident on the underside.

This species was noted in the field by Dr. Neave as being apparently distinct from *agatha*. He states that it was decidedly local, frequenting hot dry localities, and having a more restless, active, and less floating flight.

16. Neptis livingstonei.

Suffert, Iris, 17, p. 126, pl. 3, f. 10 (1904); Auriv., in Seitz, Macrolep., p. 200 (1913).

E. Africa (Lukuledi).

Suffert's description is as follows :—

Length of body 16 mm. Expanse 44 mm. Body blackish above, grey below. Upperside. Ground-colour grey black, markings white. F.-w. discal band formed of six spots in 2–6 and 9, proximally fairly straight and sharply defined from the ground-colour. Distally curved and not well defined. At nervule 4 on both sides an indentation, the nervule very black and slightly dividing the band. An inner marginal spot in 1*a* and 1*b*, 6 mm. wide at margin, rounded anteriorly, rather nearer the margin than the base. Three round dots in cell and two elongated spots at cell end. Four transverse submarginal lines, the first—counting from base outwards—just beyond discal band, very diffuse, formed of obsolescent whitish spots, the second consisting of eight more distinct white streaks broadly interrupted by the ground-colour, the third of eight narrow loosely connected streaks, the last very slender and scarcely recognisable. Fringes black, white between nervules.

H.-w. with a discal band of seven spots in 1*a* to 5; proximal edge well defined, the distal in 1*a* to 2 also well defined, in 3 to 5 suffused. The two first lines very indistinct, rather showing through from beneath, the third narrow, in 1*c* to 6 distally rounded, the outermost also narrow and closely approximated. Fringes black, white between nervules.

Underside. F.-w. ground-colour and markings generally as above, with the exception of the cell which shows seven spots, and four dots in base of 4 to 6 and 10, between cell end and discal band. The four submarginal lines heavier than above.

H.-w. discal band and lines as above, latter more distinct. Three basal bands, the first extending along costa to middle of 8. The second from inner margin to base of nervules 7 and 8 and extending slightly into area 7, the outermost from 1*a* at inner margin through

cell a little above base of nervules 5 and 6, into area 5; at end of this band a small spot in the same area.

I have found no example of this form amongst the hundreds of specimens examined. The description and figure suggest a rather aberrant example of *jordani*, though without an examination of the male armature it is impossible certainly to determine its specific identity.

17. Neptis nebrodes. Pl. XXI, fig. 4; Pl. XXIV, fig. 15.

Hew., Ent. Mo. Mag., 10, p. 206 (1874); Holl., Ent. News, 3, pl. 9, f. 1 (1892); Auriv., Rhop. Aeth., p. 169 (1898); in Seitz, Macrolep., p. 202 (1913).

S. Leone. Lagos. Ogowe. Angola. Cameroon.

Expanse 55–60 mm. Sepia brown with white markings. Upperside; f.-w. with an elongated white mark in cell, sharply pointed at base, widest at cell end, and extending into area 4 to within about 1 mm. of the discal spot in 3, where it is narrowed again and comes to a rather indefinite termination. Just above origin of nervule 3 this cell streak has a slight indentation on its costal side. In the majority of examples a minute white spot close to costa near the middle of its length. A small rather elongated inner-marginal patch formed of two spots in 1*a* and 1*b*, followed by two large subquadrate spots in 2 and 3 just separated by nervule 2, and outwardly rather divergent. In 4 a small triangular spot or streak distally placed. In 5, 6, and 9 elongated rather divergent spots, the last very small. Distal to this series of markings a pale line roughly following their contour and interrupted at the nervules. Following this a series of three pale submarginal lines, the first often rather well marked, and all interrupted by the nervules. Fringes of both wings white between nervules.

H.-w. with a well-defined white discal band 5–6 mm. wide, from middle of inner margin to area 6, where it is much narrowed. Close to the distal edge of this band a pale ill-defined line about 1 mm. wide, followed by three pale submarginal lines, the first suffused and about 2 mm. wide, the second very narrow and better defined, the last still narrower.

Underside. Ground-colour rather paler. F.-w. white at base of costa. Cell almost entirely filled with white, and a very small streak at origin of 5 and 6. The indentation in the costal side of the cell mark noted above, here contains a small white dot. Some white scales in base of area 3, several small streaks above cell end. White discal marks as above. Remaining lines much more distinct than on upperside.

H.-w. Base ground-colour with a white costal mark about 4 mm. long, followed by two curved white bands which coalesce near origin of 6. Discal band as above followed by broken whitish line which curls inwards in area 6 and follows costa for some distance. Three submarginal lines as above, but the innermost widened out into a band of large subquadrate spots, the second about 1 mm. wide, and the third very fine, all quite white.

The most distinctive feature of this species is the indentation of the white cell mark, and especially the white dot therein on the underside. Perhaps this character alone is sufficient to distinguish it from other described species.

18. Neptis jamesoni. Pl. XXI, fig. 5; Pl. XXIV, fig. 16.

Godm., Story of the Relief Expedt., p. 436 (1891); Auriv., Ent. Tidskr., 15, p. 283 (1894); Rhop. Aeth., p. 169 (1898); in Seitz, Macrolep., p. 202, pl. 48*f* (1913).

Lagos. Cameroon. Congo Region.

Expanse 55–65 mm. Sepia black with white and blue-grey markings. F.-w. with a large white mark in cell pointed at base and wide at end of cell, beyond which is a terminal patch of pale blue grey (sometimes separated). The extreme base of the white mark and as far as origin of nervule 2, also blue grey. A large white inner-marginal mark consisting of two spots in 1*a* and 1*b*, about 6 mm. long and slightly separated distally. A subtriangular mark in 2 rather distally placed and separated, especially outwardly, from a longer quadrate spot in 3. In 4 a small distal triangular spot, and a subapical series of three elongated spots distally divergent in 5, 6, and 9. Beyond this discal series a delicate line of whitish or blue-grey scales, interrupted at nervules, followed by two similar submarginal lines, the first the more distinct. Fringes of both wings white between the nervules.

H.-w. with white discal band about 6 mm. wide narrowing where it ends in area 6. Near it, distally, a pale line, and beyond it two, sometimes three submarginal lines, the first often distinctly white, the others very narrow and sometimes rather indistinct.

Underside. Ground-colour only little paler than above. F.-w. white at base on costa. Cell with a large pyriform mark cut off rather suddenly at cell end, and immediately followed by a white transverse mark, and a second more or less crescentic spot at base of area 4. Two or three small streaks near costa above end of cell. Other white marks as above but more accentuated. No blue-grey scales. First line beyond discal spots well marked but less pure white than the rest. An additional fine line at margin.

H.-w. with a narrow white costal band from base to rather l middle of costa, followed by two white bands the second broken and irregular. Discal white band as above followed narrow brownish-white line which curves inwards at 6 and tr proximally to join the costal band. The submarginal lines m more distinct than above, the innermost some 2 mm. wide and w defined.

I have seen but few examples of this species. The blue-grey marks in cell will usually suffice to distinguish it from other forms. It can be distinguished from *nebrodes* by the absence of the anterior notch in f.-w. cell mark, and from *lermanni* by the more elongated divergent f.-w. subapical spots.

19. Neptis lermanni. Pl. XXI, fig. 6; Pl. XXIV, fig. 17.

Auriv., Öfvers. Vet. Akad. Förhandl., 53, p. 431 (1896); Rhop. Aeth., p. 168, pl. 1, f. 8 (1898); in Seitz, Macrolep., p. 202, pl. 48*f* (1913); Holl., Bull. Am. Mus. Nat. Hist. p. 164 (1920).

Congo Region.

Expanse 50–60 mm. Ground-colour dark sepia with white markings. F.-w. with a large white pyriform mark in cell. This mark is generally rather ill defined, not always extending to base, where, however, the ground-colour is generally dusted with blue-grey scales, some of which are also found at the distal end of mark. Beyond this at base of area 4 an ill-defined spot largely composed of pale-grey scales. An inner-marginal patch of two spots in 1*a* and 1*b*, two subovate spots in 2 and 3, separated by nervules, a small triangular spot distally placed in 4, three spots in 5, 6, and 9 slightly separated by nervules and shorter than in *jamesoni*. Following these discal marks a pale line interrupted by the nervules, and three more or less white submarginal lines.

H.-w. with a discal white band about 6 mm. wide from inner margin to area 6, where it is rounded off and narrower. Distal to this a pale line, and three submarginal lines as in f.-w.

Underside little paler than above. F.-w. white at base of costa. Cell mark more fully developed, though tending to an invasion of the ground-colour along basal part of median. Just distal to end of cell mark a curved transverse line followed by a small ill-defined spot, and above this faint traces of small spots near costa. White discal marks as above, that in 4 not more developed than on upperside. Submarginal border lines well developed, and traces of an extra line at margin.

H.-w. with white at base extending as a fine line to middle of costa, followed by a white band incompletely divided into two. Discal band as above followed by a brownish white line which curves round at 6 to meet costal line. Submarginal lines well developed, especially the innermost, which forms a band some 2·5 to 3 mm. wide broken only by the nervules.

Judged both by the pattern and the structure of the male armature *lermanni* is very closely allied to *jamesoni*. From the few examples I have seen the ground-colour is rather browner, and the fore-wing cell mark is without the well-developed distal patch of blue-grey scales. The species is extremely rare in collections.

The six foregoing species all have the male clasper of a form characterised by a single pointed projection (in *jordani* there is an additional inwardly directed point not visible in the figure). The external patterns do not support the view that these species are more closely allied than others of the genus. Indeed, as we shall see, there are other species whose patterns appear to be much more closely allied to that of *agatha*, but of which the male armatures are of a totally different form.

20. Neptis seeldrayersi. Pl. XXI, fig. 7; Pl. XXV, figs. 5, 6.

Auriv., Ent. Nachr., 21, p. 379 (1895); Rhop. Aeth., p. 167, pl. 1, f. 7 (1898); Auriv., in Seitz, Macrolep., p. 200, pl. 48*d* (1913); Holl., Bull. Am. Mus. Nat. Hist., p. 161 (1920).

Kumasi to Mombasa.

Expanse 45–60 mm. Sepia black with white markings. F.-w. with three white spots in cell and from one to five beyond it. An inner-marginal patch formed by two spots in 1*a* and 1*b*, usually coalescent, or at most only divided by the nervule. A discal band of white spots in 2 to 6 and 9. This band may be quite continuous, with the nervules only just visible, or it may be distinctly separated into spots, distally somewhat divergent. The tendency to separation is greatest on nervule 4, but the spot in 4, though it may be narrow, is not appreciably reduced in length (differing in this respect from *rogersi* and *barnsi*). Distal to the discal band and following its contour a pale line well marked or faint, not thrown into distinct arches between the nervules. Three submarginal lines, the first

more or less expanded into spots near apex (rarely traces of a fourth near apex). These lines, however faint, are interrupted only by the nervules and never markedly obsolescent in area 3.

H.-w. with a white discal band beginning at inner margin and usually ending in area 6, but sometimes extending into area 7. Its proximal margin forms an almost continuous straight line with the f.-w. inner-marginal patch as far as the median nervure, whence it turns downwards towards the anal angle. This discal band varies in width from 4 to 10 mm. and may be quite continuous, even the nervules being white, or it may consist of spots separated by black nervules, and distally still more so by invasions of the ground-colour. Beyond this band a pale line often only faintly indicated, followed by three, sometimes four submarginal lines. Both wings with white spotted fringes.

Underside. Ground-colour little paler than above. F.-w. white at base of costa. Pattern in cell variable but usually consisting of a white mark on subcostal side with a small proximal and a larger distal posterior projection, between which are two rather faint spots. Following this an irregular line across end of cell. Several small spots above cell end. White discal marks as above, the first line yellowish white, the submarginal lines much accentuated, the most proximal one being widened into subtriangular spots towards apex.

H.-w. with a conspicuous white basal band extending along costa nearly to middle of its length, followed by two rather well-defined white bands. These are much more regular and less broken than in *agatha*. Discal band as above. First pale line well developed and yellowish white. Submarginal lines similar to those on f.-w., the most proximal being expanded into subquadrate spots.

There seems no absolutely constant character by which *seeldrayersi* can certainly be distinguished from *agatha*. The most useful is the continuity of the submarginal lines on the upperside of the f.-w. All examples of *seeldrayersi* seem to be constant in this respect, though rare specimens of *agatha* seem also to have uninterrupted lines. When this occurs in *agatha* it seems to be accompanied by a much paler ground-colour, whereas *seeldrayersi* is nearly always very dark sepia to black. The regularity of the white bands on the base of h.-w. underside is also a useful feature, these in *agatha* being almost always broken and irregular.

N. seeldrayersi is not very rare in collections but is frequently overlooked owing to its resemblance to *agatha*,

amongst long series of which a few examples may often be discovered.

21. Neptis barnsi. Pl. XXI, fig. 8; Pl. XXIV, fig. 18.

Eltr., Ent. Mo. Mag., Ser. 3, vol. vii, p. 27 (1921).

Congo Region to Semliki Valley. Kisumu.

"Expanse 55–60 mm. Ground-colour sepia black with white markings. Five white dots in cell of fore-wing, and traces of two minute dots beyond. An inner-marginal white patch of two elongated spots in 1*a* and 1*b*, their proximal edges straight, outer ends slightly separated. In 2 and 3 two white marks, proximally just separated by nervule 3, but distally more widely divergent. In area 4 an obsolescent white streak (in some co-types well developed). In 5 and 6 elongated spots divided by nervule 6 and distally divergent. A small spot in 9 near costa. Distal to white markings and roughly following their contour a fine line of bluish-grey scales which is thrown into a series of arches between the nervules. Following this, three bluish-grey lines continuous except at the nervules. Fringes spotted white between the nervules.

"Hind-wing with a discal white band about 5 mm. wide, rather narrower at inner margin, slightly projecting proximally at median, and extending to area 6. Distal edge of band indented on nervules by the ground-colour and slightly powdered with black between. Three bluish-grey submarginal lines as on fore-wing, and midway between the innermost of these and the discal band a narrow line somewhat paler than the ground-colour.

"Underside. Ground-colour paler than above. Fore-wing costa white at base and nearly to cell end. In cell a series of rather complicated white markings, consisting of a basal streak terminating in a spot, a transverse streak, two small spots, and two at each cell end. Beyond this, three or four very small spots. Large white marks as on upperside, that in 4 more fully developed, the pale lines all much more accentuated but white, not bluish-grey, and there is a trace of an additional fine line at and below the apex.

"Hind-wing with a large curved white costal band from base nearly to end of 8, followed by two less definite white bands on the brown ground-colour. Discal band as on upperside, and rest as on fore-wing."

This species closely resembles *seeldrayersi* Auriv., from which it may generally be distinguished by the obsolescent character of the streak in fore-wing area 4, and by the fact that the pale line on fore-wing immediately distal to the

discal markings is deeply arched (distally convex) between the nervules. The male armature is quite distinct from that of any other described species.

22. Neptis rogersi. Pl. XXI, fig. 9.

Eltr., Ent. Mo. Mag. Ser. 3, vol. vii, p. 29 (1921).

Rabai.

"Expanse about 50 mm. Sepia black with white markings. Fore-wing cell with three or four white dots and three beyond it. An inner-marginal white patch of two spots in 1*a* and 1*b*. Two large subquadrate spots in 2 and 3 separated proximally by the nervule, and distally by a slight invasion of the ground-colour. In 4 a small subtriangular spot, distally placed. Three subapical spots in 5, 6, and 9, the first two subquadrate, distally divergent, and the third a small streak. Just distal to the white discal marks a white line roughly following their contour. This line is not arched between the nervules. Following this, two fine submarginal lines with faint indications of a third, the first breaking into three small but rather conspicuous spots near the costa.

"Hind-wing with a white discal band 7–8 mm. wide, straight, and sharply defined proximally, regular but invaded by the black nervules distally. The outer edge of the band is closely followed by a pale line, and there are three more pale lines forming a marginal border. Fringes white between nervules.

"Underside. Not markedly paler than above. All the lighter markings chalky white. Fore-wing with white at base of costa and a complicated pattern of lines and spots in cell. In the type form there is in the cell a line along the subcostal having two downward projections, between which is a small spot. Just beyond end of this line another spot, and on the median side three spots, one longitudinal and two transverse. Four or five small spots beyond cell. (In the co-type two of the spots coalesce to form a transverse line across cell end.) The spot in 4 is very little larger beneath than above, but more sharply defined and definitely triangular. The discal and submarginal lines are broader and more distinct, only separated by fine dark lines.

"Hind-wing with a curved white costal band, but this much narrower than in *barnsi* and *seeldrayersi*. This followed by two very distinct curved white bands. White discal band very broad and extending from inner margin to area 7. Other lines as on fore-wing."

I hesitate to describe a species from ♀♀ only, but the

two examples from which the above account is compiled do not correspond with any other forms in the collections which I have examined. They are at once distinguished from *agatha* and *seeldrayersi* by the small spot in fore-wing area 4, whilst they differ from *barnsi* in the straight formation of the fore-wing discal line bordering on the large white spots. Also in the much narrower hind-wing basal costal band and in the pure white markings of the underside.

23. Neptis kikideli. Pl. XXI, fig. 10; Pl. XXV, fig. 1.

Boisd., Faune Mad., p. 50 (1833); Mab., Hist. Mad. Lep., 1, p. 171, pl. 20, ff. 9, 10 (1885–7); Trim., S. Af. Butt., 1, p. 271 (1887); Auriv., Rhop. Aeth., p. 167 (1898); in Seitz, Macrolep., p. 200, pl. 48*d* (1913).

Madagascar.

Expanse 30–57 mm. Sepia black with white markings. In f.-w. three dots in cell and sometimes one to four beyond it. A large discal white patch extending from inner margin to nervule 4 and of variable outline. In area 4 a small spot distally placed, sometimes absent. A subapical patch of three or four spots in 5, 6, and 9 or 5, 6, 8, and 9. Discal and submarginal lines extremely variable and generally obsolescent in areas 3 and 6. Fringes of both wings white between nervules.

H.-w. with a broad white discal band 6–11 mm. wide, the proximal margin of which is continuous with the f.-w. inner-marginal patch. This band extends from inner margin to area 7 or even to costa. Distally it may be of smooth outline or indented at nervules; in the latter case the internervular white marks are well rounded. Discal and marginal lines variable, sometimes scarcely evident.

Underside. Ground-colour rather paler. F.-w. white at base of costa. Cell very irregularly spotted with white, and three or four spots beyond it. White marks as above but larger. The pale discal line little developed or absent. The first submarginal widened into a band of spots conspicuously interrupted in 3 and 6.

H.-w. with a white streak at base of costa extending to end of discal band. Discal band as above. The first marginal line expanded into a row of spots and followed by one and sometimes two narrow lines.

This species may be recognised by the fact that the white markings are continuous from inner margin to nervule 4. Also it is confined to Madagascar, where it is apparently not uncommon.

It is a remarkable fact that the male armature is not constantly distinguishable from that of *trigonophora*, a species to which it bears no close resemblance.

24. Neptis trigonophora. Pl. XXII, fig. 1; Pl. XXV, fig. 2.

Butler, Ann. Nat. Hist., (5), 2, p. 177 (1878); Auriv., Rhop. Aeth., p. 169 (1898); Butler, Proc. Zool. Soc. Lond., p. 913 (1900) (? *lermanni*); Auriv., in Seitz, Macrolep., p. 201, pl. 48*e* (1913).

E. and S. Africa (Rabai to Pondoland).

Expanse 45–50 mm. Sepia black with white markings. F.-w. without white dots, but sometimes with vestiges of a longitudinal streak. An inner-marginal patch in 1*a* and 1*b*, followed by two spots in 2 and 3 slightly separated distally. In 4 a very small spot distally placed, and in 5, 6, and 9 three white spots distally separated, the third very small and streak-like. A pale discal line following the contour of the discal spots. Three delicate but usually well-defined submarginal lines.

H.-w. with a white discal band from inner margin to area 7, straight proximally and very slightly indented distally at nervules. This followed by a pale discal line and three, sometimes four submarginal lines, the innermost of these brownish, the rest extremely fine and scaled with white.

Underside. F.-w. very slightly white at base of costa, a curved clavate white mark in cell, its distal end often bordered by a delicate pale curved transverse line. Beyond this four rather ill-defined spots. White discal marks as above, followed by a well-developed pale line of a yellowish tinge and four white submarginal lines, the first about 1 mm. wide.

H.-w. with a small narrow white streak at base of costa, followed by two curved well-defined white lines. Discal band as above followed by a yellowish line and four submarginal white lines. All fringes white between nervules.

N. trigonophora is not likely to be mistaken for any other species except *strigata*, which, however, has a fully developed spot in area 4, almost invariably a white streak in cell on upperside, and has a large broad white band on h.-w. underside at base of costa. Some forms of the *nysiades* group resemble it, but these have transverse white lines in f.-w. cell beneath. Whilst individual examples of the male armature may show differences from that of *kikideli*,

an examination of several preparations convinces me that it would be impossible to decide on the anatomy alone between the two species, if indeed they are really specifically distinct. The case is the more remarkable in that whilst the armatures are so similar they are entirely different from that of any other species examined.

25. Neptis biafra. Pl. XXII, fig. 2 (*prox.*).

Ward, Ent. Mo. Mag., 8, p. 121 (1871); Afr. Lep., p. 12, pl. 9, ff. 1, 2 (1874); Auriv., Rhop. Aeth., p. 168 (1898); Auriv., in Seitz, Macrolep., p. 201 (1913); Holl., Bull. Am. Mus. Nat. Hist., pl. 8, f. 3 (1920) (*prox.*); *Non* Holl., Ent. News, pl. 9, f. 10 (1892).

Cameroon.

Ward's description of this species is as follows:—

Male. Upperside. Both wings brown black; f.-w. the cell crossed by three diagonal white marks, the outer one the largest, the inner one near the base the smallest; beyond the cell three parallel horizontal white streaks, the upper one the smallest; below midway two clear oval white spots; h.-w. crossed midway by a broad band of white, this band is also continued slightly into the f.-w.; fringe of both wings white; following the outer margin of both wings four white bands, the first from the margin very narrow, second rather broader, third broad especially on the h.-w., fourth narrow and rather undulating on the h.-w.

Underside resembles upperside, with the white markings generally broader. Expanse 2·3 in.

Ward's figure, which is rather rough, agrees with the above description. I have never seen an example exactly like the figure, and certainly there is no specimen in the four great British collections. The most characteristic features are the three white marks in f.-w. cell, in which it differs from *paula*, which has one diagonal and one longitudinal mark, and the secondary white band in the h.-w. Unfortunately the type has been lost, M. Oberthür informing me that it was missing when he acquired Ward's collection. The species, if it be a species, has been much confused with other forms, especially owing to the figure published by Dr. Holland (Ent. News, *supra*). This figure represents a form but little removed from typical *nysiades*. This error was sufficiently confusing, but the same author has only

recently (1920, *l. c.*) reasserted that this figure represents Ward's *biafra*. M. Oberthür has kindly sent me a photograph of Ward's figure, and it agrees with the copy we have at Oxford.

The differences between Ward's figure and that of Dr. Holland (Ent. News, 1892) are as follows :—

Ward's Figure.	Holland's Figure.
F.-w. cell with white transverse spot near base followed by a longer transverse mark and a long transverse streak across end of cell.	Three white dots in cell, the outermost rather elongated.
Of the three anterior discal white streaks in f.-w. that nearest costa is very small and faint.	This streak though smaller than the rest is well developed.
Following the discal band of spots is a very distinct though slender white line.	This line obsolescent.
Following the above slender line a well-developed white line formed of spots gradually increasing in size as they approach costa, till that in 6 is quite a large spot 7 × 1·5 mm.	Corresponding line very faint.
H.-w. white discal band about 6 mm. wide.	Ditto about 4 mm.
Following the discal band is a narrow white line arched in 1*a*, 2, 3, and 4 proximally convex.	No such line present.
Distal to above line a band of white spots, their proximal outline well arched (proximally convex). This band is quite 2 mm. wide in 2 and 3.	Only a faint line in this position.

It will thus be seen that whether the insect figured by Holland in 1892 be a form of *biafra* or not, it certainly differs greatly from Ward's own figure of the species.

Dr. Holland, in spite of his emphatic assertions to the

contrary, seems to have had some doubt in the matter, since in Bull. Am. Mus. Nat. Hist. pl. 8, 1920, he publishes another figure of "*biafra*" which agrees neither with his own previous illustration nor with that of Ward. It approaches more nearly to the latter in having the secondary white band on the h.-w., though this is much narrower than in Ward's figure. This 1920 figure rather supports the view that *biafra* is yet another form of the polymorphic *nysiades*, since I have before me examples of the latter which are very close to the figure in question.

Since the above was written, M. Ch. Oberthür has most kindly sent me three specimens which it was hoped might elucidate the mystery. One of these agrees so closely with Ward's original figure that I have illustrated it at fig. 2, Pl. XXII. Practically the only difference between it and Ward's specimen is that in the latter the secondary submarginal white band in h.-w. is rather broader than in M. Oberthür's example. The second of M. Oberthür's examples differs in having a still narrower secondary h.-w. band, indeed it is reduced to a mere line, whilst the third example has the h.-w. white markings so reduced that this secondary band is a mere pale suffusion.

Now it is most unfortunate that this third example, least like Ward's species, is the only male, the other two being females: hence the structure of the armature in an example almost exactly like Ward's figure remains unknown. I have made a preparation of the armature in this one male, and it is of a very simple character, somewhat intermediate between that of a form of *nysiades* and *paula*.

Now whilst the two specimens, one male and one female, which are less like true *biafra*, certainly belong to the same species, the female example which comes so close to Ward's figure is probably specifically different. If the figure on Pl. XXII be carefully examined, it will be noted that in f.-w. just beyond the discal white marks there is a distinct but delicate white line (most easily seen in the left wing). This line is deeply arched in 2, 3, and 4. The corresponding line in the other two specimens is scarcely arched at all; indeed, in one of them it is perfectly straight in area 2. Before we can be sure of the true affinities of these forms much more material is necessary. In the meantime it would appear that Ward's *biafra* is probably a good species, and that forms belonging to the *nysiades* association resemble it very closely.

26. Neptis paula. Pl. XXII, fig. 3; Pl. XXV, fig. 3.

Staud., Iris, 8, p. 368, pl. 8, f. 2 (1896); Auriv., Rhop. Aeth., p. 168 (1898); in Seitz, Macrolep., p. 201, pl. 48*f* (1913).

S. Leone. Lagos.

Expanse 40–55 mm. Sepia black with white markings. F.-w. with a subelavate mark in cell followed by a transverse mark, beyond which are three longitudinal stripes in 4, 5, and 6, the first long, the last short and very narrow, and all distally divergent. An inner-marginal patch of two spots in 1*a* and 1*b*, and two discal spots, a larger and a smaller in 2 and 3. These discal marks immediately followed by a delicate white line. Beyond this a line of white spots, transverse and linear in 1*b* to 3, crescentic in 4 and 5, and longitudinal and linear towards costa. Beyond this two fine submarginal lines broken by the nervules.

H.-w. with white discal band from inner margin to 6, about 4 mm. wide followed by a faint pale line. Beyond this a secondary discal band of white subquadrate spots followed by two very fine submarginal lines.

Underside as above, but all white markings more extensive. F.-w. with white at base of costa extending to a point below origin of 2 in f.-w. Traces of an additional fine marginal line in both wings.

N. paula is not rare in collections. The male armature is of so simple a character as to offer little suggestion in regard to affinity. The species has been bred from a pupa found by Lamborn near Lagos. The pupal skin is in the Hope Collection. The hind and inner margins of the wing-cases project so as to form prominent lateral ridges, and on the head there are two bifurcated horn-like projections.

27. Neptis rothschildi. Pl. XXII, fig. 4; Pl. XXV, fig. 4.

Eltr., Ent. Mo. Mag., Ser. 3, vol. vii. p. 28 (1921).

Congo Region (Kassai, Kingour Forest).

" Expanse 50–55 mm. Sepia black with white markings. Forewing with a white cell streak, beginning at base and passing between nervures 4 and 5 to a point considerably beyond the origin of 3. Elongated inner-marginal spots in 1*a* and 1*b*, distinctly separated. Two similar discal spots in 2 and 3 still more separated.

A white dot distally placed in area 4, and a series of three well-separated elongated spots or streaks in 5, 6, and 9. Distal to these discal spots and following their contour a very fine line of greyish-white scales. Beyond this a well-developed white line, broken into spots by the nervules. Finally two delicate submarginal lines.

"Hind-wing with a discal band about 3–4 mm. wide from inner margin to nervule 6, the spots of which are distinctly separated by the nervules. Distal to this a very faint line, rather paler than the ground-colour, followed by a narrow white secondary band of quadrate spots separated by the nervules. Two delicate submarginal lines.

"Underside. Pattern of upperside repeated, but the white marks more pronounced on a paler ground. Fore-wing white on costa at base. Cell streak larger and more sharply outlined. Above end of cell two or three additional white streaks. White submarginal bands much more distinct, especially inner one, which is widened to about 1·5 mm., and there is an extra distal line at apex.

"Hind-wing with a white costal band from base to middle of costa. The secondary discal band composed of spots much larger than above."

This species most nearly resembles *paula* Staud., but is quite differently marked in fore-wing cell above and below. Ward's *biafra* is also similar, but has three transverse white stripes in cell. All three differ from other described species in having a secondary white discal band on the hind-wing. The male clasper of the present species is quite different from that of *paula*.

28. Neptis sextilla.

Mab., Le Natural., 2, p. 99 (1882); Hist. Mad. Lep., 1, p. 174 (1887); Auriv., Rhop. Aeth., p. 167 (1898); in Seitz, Macrolep., p. 201 (1913).

Madagascar.

I am unable to give any information with regard to this species beyond Mabille's description. The latter refers to a figure on a plate which appears never to have been published. The author describes it as allied both to *saclava* and *kikideli*. It would seem unnecessary to reprint here the original description, which though lengthy unfortunately gives little idea of the appearance of the insect. Aurivillius in Seitz (*l. c.*) places it next after *paula*, though merely on probability. The type is apparently unknown, and so far no other example has been noted.

29. Neptis nicoteles. Pl. XXII, fig. 5; Pl. XXV, fig. 9.

Hew., Ent. Mo. Mag., 10, p. 206 (1874); Holl., Ent. News, 3, pl. 9, f. 8 (1892); Auriv., Rhop. Aeth., p. 168 (1898); in Seitz, Macrolep., p. 202, pl. 48*e* (1913); Holl., Bull. Am. Mus. Nat. Hist., p. 163 (1920).

S. Leone to Angola. Cameroon to Mombasa.

Expanse 37–42 mm. Ground-colour sepia black with white markings. F.-w. with a white clavate mark nearly filling cell. An inner-marginal patch in 1*a* and 1*b* followed by a more or less rounded patch of two spots in 2 and 3. A subapical patch of white in 4, 5, 6, and 9. In 4 this patch begins only just below nervule 5, so that the spot in that area is a mere streak. The discal marks followed by a pale line, beyond which are three delicate whitish submarginal lines. Fringes white between nervules.

H.-w. with a discal white band from inner margin to area 6 about 5 mm. wide, almost straight on both edges, nervules thereon not or very little blackened. Discal and marginal lines as on f.-w.

Underside. F.-w. just noticeably white at base of costa. H.-w. with a white streak at base of costa followed by two more on the dark ground of basal area. Other marks as above, but white submarginal lines much more accentuated.

This little species is apparently not very common. It may be distinguished from others by the streak of white below and adjacent to nervule 5 in f.-w.

30. Neptis mixophyes. Pl. XXII, fig. 7.

Holl., Ent. News, 3, p. 249, pl. 9, f. 11 (1892); Auriv., Rhop. Aeth., p. 169 (1898); in Seitz, Macrolep., p. 202 (1913).

? = *nicodice*. Grünb., Sitzb. Ges. Naturf. Fr. Berl., p. 470 (1910).

Bipindi. Ogowe.

Expanse 32–42 mm. Sepia black with white markings. F.-w. with white mark in cell, the edges of which are straight and the end pointed. An inner-marginal patch of two spots in 1*a* and 1*b*, followed by two subquadrate marks in 2 and 3, slightly separated. In 4 a small distally placed triangular spot, two separated elongated spots in 5 and 6, and a small mark in 9. Beyond these discal marks a fine white line broken at nervules and bent deeply inwards in 1*b*. Two whitish submarginal lines interrupted only by the nervules, and indications of a third on the margin. All fringes white between nervules.

H.-w. with a white discal band about 5 mm. wide, straight proximally, and outwardly rather indented at nervules. This followed by a pale discal line, and two or three submarginal lines.

Underside. F.-w. as above but white marks more accentuated. No white at base of costa. H.-w. with slender white line on costa at base, followed by two more, the first broad, the second narrow and faint. Beyond the discal band the pale line forms a distinct row of whitish spots, and the first marginal line is widened into conspicuous white spots, the others broader and more distinct than above.

I can find nothing in Grünberg's description of his *nicodice* to distinguish it from *mixophyes*, and there is but little except the continuity of the f.-w. submarginal lines to distinguish either from *nicobule*. However, as this is the principal distinction between *agatha* and *sceldrayersi*, it may be that *nicobule* is a separate species. Lack of material, all three forms being rare, has prevented me from making comparative preparations of the male armature, the only example available and apparently belonging to this species, is a female. The figure on Pl. XXII is really a photograph of Holland's figure. I included this rather than the actual specimen in my possession, since the latter does not agree absolutely with Holland's figure, having an additional spot in f.-w. on costa.

31. Neptis nicobule. Pl. XXII, fig. 6; Pl. XXV, fig. 10.

Holl., Ent. News, 3, p. 249, pl. 9, f. 7 (1892); Auriv., Rhop. Aeth., p. 168 (1898); in Seitz, Macrolep., p. 202 (1913); Holl., Bull. Am. Mus. Nat. Hist., p. 164 (1920).

S. Leone to Angola.

A full description of this species would be almost a repetition of that of *mixophyes*, and it will suffice to call attention to the slight differences. In Holland's original figure the f.-w. cell mark is clavate and well rounded distally instead of straight sided and pointed. The discal spots are small and rounded instead of elongated, and the submarginal lines are notably interrupted in 3. From an examination of the rather scanty material at my disposal I am inclined to think that the f.-w. submarginal lines furnish almost the only difference, and without much longer series I am unable to say whether even this is constant.

32. Neptis nicomedes. Pl. XXII, fig. 8; Pl. XXV, fig. 11.

Hew., Ent. Mo. Mag., 10, p. 205 (1874); Kirby, Handb. Lep., 1, p. 147, pl. 20, f. 3 (1894); Auriv., Rhop. Aeth., p. 168 (1898); in Seitz, Macrolep., p. 201 (1913).

Ashanti to Angola. Uganda.

f. *quintilla*. Pl. XXII, fig. 9.

Mab., Ann. Ent. Fr., (6), 10, p. 21, pl. 2, f. 7 (1890); Auriv., Ent. Tidskr., 15, p. 281 (1894) (as *nicomedes*); Rhop. Aeth., p. 168 (1898); in Seitz, Macrolep., p. 201 (1913); Holl., Bull. Am. Mus. Nat. Hist., p. 162 (1920).

Lagos. Ivory Coast. Cameroon. Angola. Kassai. Entebbe.

f. *puelloides*, f. nov. Pl. XXII, fig. 10.

Lagos. Gold Coast. Kampala.

nicomedes nicomedes.

Expanse about 38 mm. Sepia black with white markings. F.-w. with a white mark in cell sometimes clavate extending from near base, widening and curving over downwards and outwards to end of cell, sometimes divided into two, the basal part remaining only as a dot. On inner margin a white mark in 1*a* and 1*b*, the marginal part rather wide and the inner edge forming a continuous straight line with that of h.-w. discal band. A large continuous white discal band from 2 to 9, its outer and inner edges regularly curved, proximally concave, distally convex. Beyond this a pale line, faint or well developed, followed by a narrow white line which is usually expanded into a spot near apex. Two delicate submarginal lines, more or less interrupted in area 3, especially beneath.

H.-w. with a broad discal band about 5 mm. wide, both edges rather straight, and nearly parallel, extending from inner margin to 6, this followed by a pale line and three submarginal lines.

Underside. The clavate mark in f.-w. cell better developed than above, and sometimes with a faint pale transverse line beyond it. Base at costa faintly white. Other marks as above but marginal pattern whiter, and interruption of lines more obvious in 3, and often in 6.

H.-w. with a conspicuous curved white band at base of costa, extending to middle of same, followed by two narrow lines, the lower rather longer than the upper. Other markings as above but marginal lines more developed.

nicomedes quintilla.

Resembles type form, but the spots in f.-w. 2 and 3 are short and quadrate, so that the contour of the inner edge of the discal patch is materially altered. All stages of intermediates occur.

nicomedes puelloides.

F.-w. cell without any trace of white mark, and on underside the white in cell is reduced to a line on subcostal which curves sharply downwards and outwards at cell end. Just beyond this a transverse white line. The spots in f.-w. 2 and 3 vary in length, so that the proximal edge of discal patch may be of the type form or may approach that of *quintilla*. This form bears a close resemblance to *puella*, but may generally be distinguished therefrom by the proximal edge of the f.-w. discal band, which in *nicomedes* is concave or even indented, whilst in *puella* it is straight or even convex. Also in *puella* there is no interruption in the f.-w. submarginal lines. The interruption of the f.-w. lines is the sole distinction apart from the armature between *nicomedes* f. *puelloides* and certain forms which appear to be conspecific with *nysiades* f. *continuata*.

Type Hope Collection, Oxford. Taken by Lamborn at Oni, Lagos, Dec. 1911.

33. Neptis puella. Pl. XXII, fig. 11; Pl. XXV, fig. 12.

Auriv., Ent. Tidskr., 15, p. 285, f. 11 (1894); Rhop. Aeth., p. 168 (1898); in Seitz, Macrolep., p. 201 (1913).

Cameroon. Congo. Uganda.

Expanse about 35 mm. Sepia black with white markings. F.-w. without marks in cell. An inner-marginal patch in 1*a* and 1*b*, its inner edge quite or nearly continuous with that of h.-w. discal band. A large continuous discal patch from 2 to 9, the inner edge of which is either straight or convex. This patch not or but little reduced in width till just before reaching costa, where the spot in 9 is very small. The usual discal pale line followed by three fine whitish or bluish-grey submarginal lines, these interrupted only at nervules. Fringes white between nervules.

H.-w. with large discal patch, continuous and with smooth outline followed by discal and submarginal lines as on f.-w.

Underside. F.-w. as above but white markings especially submarginal lines much accentuated. Costa whitish at base. In cell a longitudinal streak on subcostal, followed by a diagonal line across end of cell.

H.-w. with large white curved band on costa from base to a point just above end of proximal edge of discal band, followed by two narrow whitish lines. Otherwise as above with pale lines accentuated, the discal line brownish white.

This species may be distinguished by its small size and by the large continuous discal patch in f.-w. The straight or convex proximal edge of this patch and the uninterrupted submarginal lines distinguish it from *nicomedes puelloides*.

34. Neptis nina. Pl. XXV, fig. 13.

Staud., Iris, 8, p. 369, pl. 8, f. 1 (1896); Auriv., Rhop. Aeth., p. 168 (1898); in Seitz, Macrolep., p. 201 (1913).

E. Africa (Usagara).

Expanse about 30–35 mm. Resembles *puella*, but the f.-w. discal patch is smaller and rapidly narrows from area 4 almost to a point in 6. The discal pale line very faint, but the first submarginal line well developed and expanded into spots towards apex. The submarginal lines interrupted in 3 especially beneath. First submarginal line on h.-w. also formed of distinct white streaks.

I have seen but two examples of this species. Aurivillius regards it as a race of *puella*, but if the structure of the armature is constant then it must be given specific rank. It is easily recognised and not at all like any other form except *puella*, from which it differs as above described.

35. Neptis melicerta. Pl. XXIII, fig. 1; Pl. XXV, fig. 14.

Drury, Ill. Exot. Ins., 2, p. 34, pl. 19, ff. 3, 4 (1773); Herbst, Naturs. Schmett., 9, p. 84, pl. 238, ff. 5, 6 (1798); Staud., Exot. Schmett., 1. p. 147 (1886); Holl., Ent. News, 3, pl. 9, f. 5 (1892); Karsch, Berl. Ent. Zeit., 38, p. 186 (1893); Auriv., Rhop. Aeth., p. 169 (1898); Roth. & Jord., Novit. Zool., p. 537 (1903); Rogers, Trans. Ent. Soc. Lond., p. 505 (1908); Neave, Proc. Zool. Soc., p. 33 (1910); Auriv., in Seitz, Macrolep., p. 202, pl. 48*e* (1913); Holl., Bull. Am. Mus. Nat. Hist., p. 164 (1920).

= *blandina*. Cramer, Pap. Exot., 4, p. 76, pl. 327, ff. E, F (1872).

= *melinoe*, God., Enc. Meth., 9, p. 432 (1823).

S. Leone to Uganda.

subsp. *goochi*. Pl. XXIII, fig. 2.

Trimen. Trans. Ent. Soc. Lond., p. 336 (1879); S. Afr.

Butt., 1, p. 273, pl. 5, f. 6 (1887); Butl., Proc. Zool. Soc., p. 65 (1888); Auriv., Rhop. Acth., p. 169 (1898); Neave, Proc. Zool. Soc., p. 34 (1910); Auriv., in Seitz, Macrolep., p. 202, pl. 48*f* (*not typical*) (1913).

E. Africa to Natal.

melicerta melicerta.

Expanse 30–55 mm. Sepia black with white markings. F.-w. with a large white mark in cell, wedge shaped, sometimes suffused on subcostal side, cut off rather sharply at distal end, and followed closely by a white triangular mark; this sometimes faint, and rarely joined to cell mark at posterior corner. On inner margin a white streak-like mark in 1*a* with a second smaller one in 1*b*, these generally confluent. In 2 and 3 two elongated white marks, usually separated by broadly blackened nervule. In 4 a small spot distally placed, and in 5, 6, and 9 three elongated spots, the first two generally well separated. Following these discal marks a pale line of variable distinctness beyond which are three delicate marginal lines, they and the white marks on fringes being more or less interrupted in area 3 and often in 6.

H.-w. with a white discal band, proximal edge of which is very straight, and continuous with that of the f.-w. inner-marginal spots. Distal edge moderately straight, but often indented at the nervules. A pale discal line followed by internervular marks rather darker than ground-colour, then another pale line (the first of the marginal series), and finally two delicate but usually well-defined marginal lines.

Underside. F.-w. just perceptibly white at base of costa, other markings as above on a rather paler ground, but pale lines much accentuated. An additional marginal line which with the others is notably interrupted in 3.

H.-w. with a short white curved band at base, followed by two straighter lines on the dark ground. Other markings as above but pale lines more distinct, and an additional one on margin.

melicerta goochi.

This form differs from the type in having the f.-w. discal spots more confluent, and in particular in the obsolescent character of the cell mark. The typical *goochi* is really an intermediate between two more definite forms, the one having all white marks fully developed (= Auriv. fig. *l. c. supra*) and the discal spots confluent, the other having the f.-w. cell mark reduced to a spot at the distal end, and the discal spots only rather more confluent than in the typical form. All kinds of intermediates occur, though the prevalence of the diminished cell-spot form in S. and E. perhaps entitles it to subspecific rank.

Neptis melicerta is very common and easily recognised. The male armature is of a simple structure not particularly constant and but little distinctive. The species has been bred by both Lamborn and Farquharson. Only the pupal skins are preserved. They show, though to a less extent than in that of *paula*, the expansion of the wing-cases, and appear to have only a single horn-like projection on the head.

36. Neptis strigata. Pl. XXIII, fig. 3; Pl. XXV, fig. 15.

Auriv., Ent. Tidskr., 15, p. 284, f. 10 (1894); Rhop. Aeth., p. 168 (1898); in Seitz, Macrolep., p. 201, pl. 48*e* (1913); Holl., Bull. Am. Mus. Nat. Hist., p. 163 (1920).

Cameroon to Uganda and S. Sudan.

Expanse 45–50 mm. Rich sepia black with white markings. F.-w. with a white mark in cell, rather variable, but on the whole clavate. When well developed, of curved pyriform outline. A large inner-marginal patch of two spots in 1*a* and 1*b*, the inner edge of which is not usually continuous with that of the h.-w. discal band. Two rather short outwardly rounded spots in 2 and 3, tending to be separated distally, and a subapical patch of four spots in 4, 5, 6 and 9, confluent or but little separated. These followed by a pale line and three submarginal lines, the first of which is developed into a diagonal streak or streaks near the apex. Marginal lines interrupted only by the nervules. Fringes white in internervular spaces.

H.-w. with a white discal band about 6 mm. wide from inner margin to 6, where it is rounded off. Following this a line rather paler than the ground-colour, and three delicate submarginal lines.

Underside. Ground-colour paler, white marks more developed. F.-w. faintly white at base of costa. Clavate mark in cell followed by a pale or white longitudinal mark, sometimes with traces of diagonal streaks above it near costa. The first submarginal line on both wings developed into a band of spots. Traces of an additional line at apex.

H.-w. with conspicuous basal white band from base of costa to about the middle of its length, followed by two narrow white bands, the second much larger than the first.

N. strigata is easily distinguished on outward characteristics, but its specific distinction is very doubtful, the male armature being quite indistinguishable from that of a peculiar form of *nysiades* which I have dissected. This *nysiades* form nearly resembles Holland's *continuata*.